ATTACHMENT H

REPORT ON ENVIRONMENTAL DEFENDERS FOCUS GROUPS & WEBSITE

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GOODWIN SIMON
STRATEGIC RESEARCH

MEMORANDUM

January 11, 2014

TO: **ROGERS FINN PARTNERS**

FROM: **PAUL GOODWIN**
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RE: **Findings from Focus Groups with Teachers and Principals**

METHODOLOGY

At the request of Rogers Finn Partners, Goodwin Simon Strategic Research conducted four focus groups with teachers and principals working at elementary schools in Los Angeles County. The purposes of the groups were to help develop the teacher and student websites for the Environmental Defenders assembly program and facilitate marketing of the assembly to schools. Specifically, we explored:

- Current computer use by teachers to support classroom learning and home computer access by students
- The elements of successful school assemblies
- Strategies for placing the Environmental Defenders assembly at schools
- The elements of a website for teachers that will be useful and informative
- The elements of a website for students that will be appealing
- Reactions to existing Environmental Defenders materials including the teacher website, Resource Packet, and the flyer, and how they might be revised and updated

The groups met on December 3, 2013, in the Westchester/LAX area and December 9, 2013, in Pasadena. To qualify, participants had to teach or serve as a principal or assistant principal in an elementary school in Los Angeles County; several parochial and charter school employees were included. We also screened participants to achieve racial/ethnic diversity among teachers and principals, and to reflect the socioeconomic status of Los Angeles County students. All participants

were screened to ensure that they use the Internet to find materials suitable for use in their classroom.

As always with focus groups, we caution the reader that focus group participants are not selected randomly and the results cannot be viewed in the same light as findings from random sample surveys.

Where appropriate, we compare relevant findings from these focus groups with those conducted for The Rogers Group in 2008 which explored similar topics.

References in this memo to "teachers" should be read as shorthand for "teachers, principals, and assistant principals who participated in the focus groups." Each group of eight or nine participants included up to two principals or assistant principals.

FINDINGS

Overview

Since our 2008 focus groups, teachers have thoroughly incorporated Internet use into their classroom preparation and teaching. Teachers routinely use the web as a teaching resource and frequently bring web-based materials directly into the classroom to use with students. Teachers' expectations have also been defined by sophisticated, subscription-based websites that allow for customization of content, and monitoring of student website activity.

Several important takeaways emerged from the focus groups:

1. While all the teachers recruited for these focus groups use the Internet for lesson preparation and/or in the classroom (a significant change since 2008), student access to computers and mobile devices with Internet access at home is uneven, and teachers in low-income schools are not able to make homework assignments that require computer or Internet use as a result. All schools represented by our participants did have a computer lab and teachers were open to taking their students to the computer lab to have the students engage in curriculum-related activities.

2. The Environmental Defenders assembly and its teacher website must explicitly link to the new Common Core standards[1] and the Next Generation Science Standards (NGSS).[2] The introduction of Common Core and NGSS standards have added new challenges to teachers' work and they are struggling to adjust their curriculum to meet these new standards. To complicate things further, some of the standards have not yet been established. Parochial schools as well as public schools have adopted the Common Core.

Teachers are eager for resources that will make meeting their classroom responsibilities easier. Their time is at a premium. A recurrent recommendation was that Environmental Defenders make teachers' jobs as easy as possible. Make it simple! "We're inundated right now," one teacher said. Teachers clearly value websites that are free and easy to navigate and designed to provide teachers with quick access to a lesson, to its objective and explicit connection to the Common Core and NGSS standards, to the prep time required and time it takes to teach, and to download/print resources. "Fun projects are not worth it," one teacher said. "It's not going to happen. There has to be a why."

3. Teachers saw an opportunity to update the website in terms of content, backend technology, and design. They envisioned appropriate games and activities on the website, which link to the Common Core standards and go beyond the specific topics detailed in the assembly (e.g. sources of stormwater pollution, household hazardous waste, recycling, etc.) and help kids meet broader requirements for writing, math, critical thinking, collaboration, research, etc. Teachers would also like the ability to keep track of whether their students are doing the work, and how they are doing. The Khan Academy and Pearson Success Net are good examples of these kind of websites, in which students take part in curriculum oriented games, activities, and quizzes while teachers can keep track of their progress. Finally, teachers wanted to see improved design that was easy to navigate (teachers were sometimes confused by the relationship of the DPW and the Environmental Defenders information); more visuals with less text, and that provided them with ready to print PDFs and other classroom ready materials.

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[1] For further information on the Common Core standards, see the California Department of Education website. http://www.cde.ca.gov/re/cc/

[2] What's the difference between Common Core and Next Generation Science Standards? The Common Core State Standards (CCSS) for Literacy were written to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The literacy standards do not replace science standards-they supplement them. The NGSS lay out the disciplinary core ideas, science and engineering practices, and crosscutting concepts that students should master in preparation for college and careers. Source: http://www.nextgenscience.org/frequently-asked-questions#CCSS Literacy

The website video on the home page is very important. It is liable to create the first impression of the website for almost all teachers.

4. High quality assemblies are valued by teachers when they enhance curricular content, engage students, are scaled for grade levels (K-2, 3-5), and standards based, and last, but by no means least, free. Although it was not viewed as a highly effective strategy, emailing teachers and principals with information about the assembly was recommended, though face to face meetings with parents and principals groups, or mailings sent via teachers' associations or conferences were regarded as likely to be more impactful. Word-of-mouth recommendations are incredibly important in determining whether assemblies are booked or not. Although this idea was not discussed with the groups, Environmental Defenders may want to consider ways in which it could incentivize word-of-mouth recommendations by teachers through Facebook, Twitter, Pinterest, email or other means.

Emailing teachers in advance of the assembly with a link to the website and a "cheatsheet" (a quick how-to for the website) may encourage teachers to familiarize themselves with the site in advance of the assembly, see its value, and may encourage teachers to return to the website after the assembly.

Use of Computers in the Classroom

Teachers now report using the web for "everything" including research, lesson plans, and curriculum support. One teacher reported, "I rarely buy teaching materials anymore at a teacher's store… I use the Internet to Google an idea I have for a lesson plan, look for videos, look for lessons… I look for ways to enhance my own ideas."

Teachers are also universally using websites in their instruction, which is a change since the 2008 focus groups. Teachers are also able to use videos that are posted to YouTube. Some schools have a 30 minute firewall and some teachers were less confident than others that they could readily access YouTube, but all teachers suggested that while it may not be easy and unrestricted at every school, they could if desired access YouTube videos or other sites that host videos.

However, and significantly, not all kids have access to the Internet at home. Estimates of computer or smart phone penetration at home varied among the teachers depending on the affluence of the community in which they teach,

although, many teachers believed students had smart phone access if not computers at home. Some schools do not allow teachers to require homework that involves computer use at home. Even with the anticipated rollout of the LAUSD iPad program, teachers noted, students will need Wi-Fi at home to complete homework assignments, and Wi-Fi penetration for students at home appears uneven. This suggests that lower income students would be using the Environmental Defenders website only at school and won't have an extended opportunity to visit and explore it.

If true, this underlines the importance of making the instructional part of the website clear and evident to teachers. If they are going to devote student time in the computer lab to this website, teachers need to understand how it helps them teach as much as they need to understand how it helps students learn.

Despite uneven student access to the Internet at home, this is a propitious time to provide new computer resources to teachers since they are eager to provide computer experience to their students. The new Common Core tests will be taken on computers and teachers want to find ways to give their students experience that replicates the new test environment and goes beyond multiple choice questions. "This is a prime time to come at teachers [with new computer based learning] because… we want to get ready for that Common Core, so right now we're open," one teacher said.

Over and over, we heard teachers emphasize the importance of the Common Core standards. One teacher said, "The idea of having students complete an assignment just for the sake of completing an assignment or just because it's cute or anything like that no longer flies. So we want all of our assignments, activities, even artwork somehow tied into the current standards."

School Assemblies

All schools except one charter had either an auditorium or a cafeteria that could be used for school assemblies. Teachers who had seen the Environmental Defenders assembly, even though years have passed since they saw it, remembered it and most remembered it favorably. Teachers like that it was relevant, included "big personalities," and that afterwards the kids wanted to act like the characters.

Teachers noted other popular assemblies including Walk Through California, Walk Through the American Revolution, Bully Dudes, Story Pirates, Safe Moves, and the LA Jazz Society among others. These assemblies were admired for providing quality

performances, and creating an interactive and participatory experience for students, from collectively developing a story and acting it out to bringing animals to the school so students could touch them.

When asked how to interest them in an assembly, teachers stressed how important it was that the assembly be free, enhance student learning and teaching of the curriculum, and that it come recommended by colleagues (teachers or principals) or parents.

Teachers made it clear that cost is an extremely important factor. It was raised by teachers in every group. However, substance is also a must. One teacher said, "It has to have meat. It has to be of quality, not just something because it's free." Another teacher offered a third criteria, "…to enhance the instructional program. Otherwise, I'm not going to do it." When asked to identify a fourth selling point, teachers named activities and lesson plans that the teachers can take back to the classroom.

Teachers were asked to define the "elevator speech" for an assembly, one group responded by saying: Free. Multimedia. Fun. Grade specific. Engaging. Connect the content to science and math. One teacher said, "Get them up on stage, do some role playing, get them dancing, get them doing theater." Teachers noted that assemblies were a way of rewarding students and a way to bring theater to kids who can't afford to go to a production. "This may be the only type of entertainment this child gets," noted one teacher.

To interest them, teachers say that the sponsors of the Environmental Defenders Assembly had to make clear the assembly's purpose, and that it is:

1. Free
2. Standards-based
3. Scaled for various grade levels K-2, 3-6
4. Interactive and involves student participation
5. Visual
6. Incorporates quality music and dance.

Though authority to approve assemblies varies a bit in different types of schools and from school to school, participants report that most often assemblies are approved and booked by the principal. In parochial schools one teacher said the archdiocese makes decisions, another said that the school had the authority to make decisions. In charters, one teacher identified the vice principal and said the CEO would only be involved if there were a cost for the assembly.

At parochial schools and charters, teachers agreed that schools "…are eating up anything. They're trying to get stuff. They don't have these huge long relationships. They're trying anything so if you called our office and said, "I have this and it's a free assembly' you'll get time with the principal."

One teacher mentioned having booked assemblies through the Bureau of Lectures and Concert Artists (BOL) (http://www.assemblyline.com/), which offers a wide array of assemblies to schools throughout North America and Canada.

Most assemblies come to public schools via strong word-of-mouth. One principal described it this way, "If Lisa calls me and says, 'Henry, hey I just got a great assembly and it was free,' bam, book it. It's word-of-mouth…"

A Title 1 coordinator, passionate teacher, or even parent groups can and do bring ideas to principals and champion particular assemblies. "I think parents are a great in," said one principal. "Parents who are on these committees usually have more time to pre-screen things than teachers and principals. We're bogged down. You do want to screen to make sure it's appropriate and age-appropriate and core standards appropriate." Teachers recommended getting parents involved by attending a PTA meeting and presenting ten minutes of the assembly. One teacher said, "If you get some parents on your side they'll bring it to the school every year. They'll say, 'We love that assembly.'"

Teachers identified several ways to notify teachers and principals about the availability of the assembly. Although many teachers recommended that the Environmental Defenders reach out to principals and teachers via email to notify them about the assembly, others believed face-to-face strategies would be more effective. Teachers recommended:

1. Mail and emails with an embedded link to the assembly's website. Participants noted that "the source" was more important than "the subject line" in convincing them to open an email
2. Present at PTA or "Friends of School" meetings
3. Identify someone in the District Office who can disseminate information to all principals or present to principals' (or deanery in parochial schools) meetings
4. Send information through teacher associations or unions or present at their conferences (e.g., CTA's Good Teacher Conference or the Science Teachers Association)
5. Advertise in the back of LA Parent Magazine

Teachers said it wasn't a good idea to reach out to them during their professional development time.

Because most assemblies are booked at least in part in response to strong word-of-mouth, Environmental Defenders may want to consider new ways in which it could mobilize principal, teacher, or parent word-of-mouth recommendations to support promotion of the assembly.

Comments on the Flyer Promoting the Assembly

When shown the flyer and asked for comments, teachers said it must prominently state that the assembly is free and standards-based. In addition teachers recommended that it be made clear that the assembly could be integrated into the language arts curriculum and that teachers could meet language arts and science requirements at the same time. Teachers in one group suggested that Environmental Defenders emphasize science and language arts over history. "That's a big thing right now is getting your science and your ELA (English Language Arts) done at the same time."

In addition teachers encouraged Environmental Defenders to add a "deadline to register" to give it a sense of urgency and consider a testimonial or endorsement, however, response to this promotional idea was mixed. Teachers differed on what would be most effective: an endorsement from an affluent district or from a student and/or parents illustrating how the kids were transformed by the assembly.

Another frequently heard recommendation was that the characters on the flyer be updated. Some teachers agreed that the kids did "not look cool."

Teachers saw an opportunity to cross promote the assembly and the website on the flyer, recommending that it include information about the availability of follow up activities. To further integrate the assembly and website activities, teachers said, the Environmental Defenders program could provide teachers with a pre-assembly packet or references to website activities to prepare students. During the assembly, teachers recommended that the script promote the website.

What Teachers Look For In Websites They Use

In discussing the Environmental Defenders website, teachers stressed that the site must be free and easy to navigate, relate to the new standards, enhance their teaching, and be fun and interest their students. Teachers recognize the importance of having "fun" elements or a "fun section" to capture students' attention and motivate them, but also emphasized the importance of being able to make assignments, customize the difficulty for individual students, and monitor students' work.

What we heard throughout our discussion with teachers was the importance of websites and website materials being free and simple to navigate. "It's got to be really clear," said one teacher "… not complicated. There aren't a lot of steps to get to where you need to go."

In addition, teachers indicated that good websites should be explicit about how they meet NGSS or Common Core standards and provide downloadable printouts and other ready-to-use materials for the classroom. Teachers in some groups noted that some sites now include PowerPoints that are classroom-ready. "If it enhances my curriculum, my ability to teach. That's what's in it for me," one teacher said.

Several teachers also expressed a strong desire to be able to personalize their students' experience, e.g., to be able to upload their own questions related to activities on the site, to monitor student activity, as well as customize the levels of difficulty for individual students.

When we asked teachers how to monitor student work without a sophisticated backend technology, teachers suggested workarounds such as allowing students to print out assignments or save files on a flash drive so the teacher could print out assignments if students didn't have printers at home or providing students with a "secret word" when they complete the activity that they could bring to class the next day.

Teachers learn about quality websites in a variety of ways, including word-of-mouth, district recommendations, a Google doc that provided recommended links, and from school "technology mentors" who recommend sites.

In our focus groups, teachers mentioned a number of valued websites, some of which have a "teacher side" that allow them to give students passwords so the site

can be better individualized for students, and so teachers can pull reports to provide parents with feedback. Examples they mentioned include:

- Accelerated Math (RenLearn.com)
- Brainpop (brainpop.com)
- Club Penguin (clubpenguin.com)
- Cool Math.com (coolmath-games.com)
- Henry Anker.com. (henryanker.com. Teachers noted that it is very interactive, provides instant corrections and has no ads!)
- I Excel (www.ixl.com)
- JPL got very high marks from one participant. "Everything you need is there. It integrates with science and math and they even have a written connection. It links to the Common Core. It's free." (www.jpl.nasa.gov/education)
- Minecraft.net
- Number Munchers (www.numbermunchers.com)
- Multiplication.com
- Next Generation Science Standards (NGSS) (nextgenscience.org)
- Pearson Success Maker (www.Pearsonschool.com subscription based)
- Pop Tropica (www.poptropica.com)
- Raz-Kids.com (subscription based)
- ReviewGameZone.com
- Reading A to Z (www.readinga-z.com subscription based)
- Spelling City (www.spellingcity.com)
- Starfall (www.starfall.com)
- ST Math (www.stmath.com)
- SumDog (www.sumdog.com)
- Ticket to Read (www.tickettoread.com)

Despite the pressure on teachers' time, some teachers expressed a desire for a tutorial and the ability to "play with it [a website]." "I would just want time to play with it first and then be able to provide it to my students," she said noting that sometimes teachers "aren't as technologically savvy as the kids," then adding "not sometimes, most of the time!"

Another teacher said, "Honestly I want to have it in my hands. I want to see it. I want to access it. I want a tutorial. I want someone to tell me what I can do with it, how I can use it. I want to make up my own mind. I don't want to hear, 'Oh it was used in Massachusetts.' I want to have two hours to sit and play with it."

Several teachers mentioned the value of "cheatsheets" that help them use website resources. Teachers make their own cheatsheets with basic how-tos for a website. They also make them for parents for home assignments. It is a role that "tech mentors" play at some schools and Environmental Defenders could provide them for teachers.

Websites Kids Like to Use

When asked, teachers were quick to identify website features that helped grab and keep students' attention. "Avatars," they said. And "animation." And "characters, dancing and doing something that's going to be captivating." Another teacher in the same group added: "Maybe some video and some audio, some pictures, some good text features with headings." Another participant noted that "too many words freak them out so everything has to be short like paragraph size. If it's like a big long full page paragraph, forget it... everything has to be broken into small chunks."

Participants also recommended games that were competitive, multilevel in which kids could win bonus points or "virtual badges" or positive reinforcement messages such as "Good job!"

Teachers noted that girls were going to want "pretty sparkly" things and "creativity," "to make stuff" in their games. Boys want to "blow stuff up."

Several teachers also noted that these elements should be housed on the website itself instead of sending users to Google or YouTube for this content.

Teachers said kids like websites that include:

- Video
- Games in which kids can "level up" and games that provide scores so that kids can be ranked
- Rewards – stamps, artifacts, badges, or feedback like "Good job!"
- Bright colors
- Explosions and sound effects for boys
- Creativity and sparkles for girls
- Not too many words
- A simple intuitive interface
- A search function
- Avatars
- Animated characters the students can relate to

Teachers recognize that students need to like a site in order to learn from it, so they said, "you can't have it be too academic." "[A website] has to motivate the kids to want to learn about the topic… What's going to get them excited for this unit of study? So I think first and foremost is you got to catch them with the motivation. So that could be, not an explosion, but a video that's very animated, very attractive for kids. It says, 'Hey, I want to learn about this.'"

Teachers in one group cited *Oregon Trail* (an online game produced by The Learning Company (http://www.oregontrail.com/) as a model which helped students problem solve and apply skills to real world scenarios. One teacher explained: "They have to decide what they have to take in their wagon. They only have this much money or resources to spend and only this much room. Are they choosing rifles and ammo over food? They come across the river. You're too heavy, what are you going to lose? It's all these problems that they've got to solve along the way and they love that." Another teacher summed up: "It's math, science and decision making."

The Existing Environmental Defenders Website

Participants in the focus groups were paired and provided with laptop computers with the existing Environmental Defenders website open on them. They were then given about 15 minutes to explore the website and fill out an evaluation form. This was followed by a discussion.

Overall, teachers did not feel the website was effectively promoting the assembly. "How does it excite me about the assembly? It really didn't do anything for me," one teacher said. "There was too much writing and too little pictures and you really had to search. In real time, I don't have time to sit there and read all of this. It needs to be faster."

Another teacher said: "You want to make it as easy on teachers as possible to get this in. I'll be honest with you, my first thought is I would never take the time to do this. The amount of time, the prep time as well as teaching a lesson. We're inundated with so many things right now. I don't have time to do this. It's nice if we take the kids to the assembly and they're exposed to it, but as far as extra things that are being asked of the teachers to do in preparation for this assembly or as a follow up to the assembly, forget it. There's going to be no buy in at my school at all."

One teacher recommended that the Environmental Defenders assembly include more material intensive lessons. "I would love to see trucks come out and actually do lessons with the kids where they have a first-grade recycling day," a teacher said. "They do one of these lessons. Part of the problem is getting the materials. We don't have blenders. We don't have nylon screens." Teachers also recommended that if some lessons took too much classroom time Environmental Defenders could videotape the activity so teachers could show the video in their classroom or that students could be asked to do them at home.

In most of the groups, the majority of teachers immediately clicked to play the video suggesting that the video is going to create the first impression for many teachers. One teacher said the video was too short. Teachers also wanted the video to go full screen because they might show it to students to get them excited about the assembly. On the other hand, teachers acknowledged that the video shouldn't simply be an unedited excerpt of the assembly since then they might just show the video instead of booking the assembly.

We heard repeatedly that the lessons in the teacher resource packet were too complicated or too lengthy and did not correspond with current Common Core standards.

In addition, teachers noted that:

1. There was too much text.
2. The pictures were too small.
3. It was not exciting.
4. It looks old.
5. The colors were uninspired.
6. It should indicate that it is appropriate for K-2, 3-6, or both.
7. It shouldn't look like a government website. (They noted that the DPW lends legitimacy, but also suggests that the program may be boring. One teacher said the DPW association raised the question of DPW's "agenda." "I didn't hear the word 'education' or 'students.'"
8. Since so many of the students are in Spanish-speaking homes, the letter that goes home to parents as part of the website shouldn't be English only. Families will throw it away if it's just in English, one teacher said.
9. Teachers said the "We're Back" language was meaningless to teachers who didn't know of the assembly and because some teachers have seen the old assembly, the website should address this by saying "new and improved" or "version 2.0" so teachers know it has been updated.

10. They frequently clicked on the wrong tab and ended up lost in the main DPW website.

Several teachers wanted to make the content relevant for older kids by including content that showed the consequences of bad environmental practices or shows them what can be made with recycled materials. "I would like to see videos of recycling plants," one teacher said. "What happens to newspapers that I put in the blue bucket instead of a black bucket? Where do I buy paper that's made from recycled fibers? I'd like to know that, things like that. This makes it a little bit more relevant for older kids to say, 'Oh this is why it's important.' I want to be able to go boogie boarding in Malibu without being hit in the face with garbage.'"

The central challenge the Environmental Defenders program faces in persuading teachers to use website resources in the classroom can be summed up in this teacher's declaration: "We're inundated right now. With everything we're trying to get in as well as the assessment in science. The writing assignments that we're doing. There's so much going on right now that as far as I'm concerned this is just an assembly and to make me do, or expect me to do more than just take the kids to the auditorium for an hour, it's not realistic."

In fact, several teachers after spending time on the website concluded that the assembly wasn't a stand-alone resource. One teacher said, "It's not just taking the kids to an hour long assembly. It's also doing the follow up lesson that was listed in the teacher packet." A second teacher concurred. "It says to get the most out of the assembly, obviously you want the most out of it. But it says to get the most out of your assembly there's this huge, not huge, but there's a teacher resource packet and a lot of literature to read through."

Few teachers believed that teachers would do the bigger activities in the Resource Packet. Teachers recommended a quick and simple lesson or activity that includes an indication of how much prep time and classroom time is required. "Honestly I feel like I don't have enough time to teach the curriculum. So I'm really tight on time. I always look for activities that doesn't need that much time." Another teacher said: "It's like we want something that is ready to use. Yeah, it has a lot of stuff in here, but teachers have to read it. How many of you guys have 30 minutes to plan for a 60 minute lesson?"

Despite these reservations, teachers agreed that the lesson plans were a net positive, despite their belief that many teachers would not use them. "In theory, they're wonderful ideas, and if we had all the time in the world, and all the energy in the world we'd love to do it."

Teachers liked that the Environmental Defenders website is free and without advertising. "A double plus," one teacher said. Teachers also liked the structure provided for the activities. "I like that it gives you the method, the materials, the pre-activity procedure. Everything is very clear. It's too wordy, but the structure I like."

When asked how the current Environmental Defenders website could be modified to better meet their needs, teachers had many suggestions to make the Resource Packet easier and more practical from the cosmetic to the substantive.

Among teachers' cosmetic recommendations, they said the site has "too much text that was too small," and recommending that each lesson "be limited to one page." Teachers would like to see "graphic organizers" (handouts with designated spaces for student participation) and other "printables" for student use.

Teachers also recommended that the Resource Packet "provide grade level specific, single-page passages at three different levels with comprehension basic questions after" that require a written response.

Most importantly teachers urged that it be linked to "specific standards." Teachers noted that website activities could and should connect to the NGSS standards and for the math and writing Common Core. This should be prominently featured on the website and Teacher Resource. Teachers had a number of ideas for tying activities to Common Core standards:

Activities could include "comprehension questions," "writing prompts," and "the interpretation of graphs and data" to support the Common Core standards and integrate science and language arts. "If this was in my *Time for Kids* this week, there would be a teacher guide that says how to implement it with the Common Core. There'd be a suggestion for a cause and effect essay or persuasive letter to a friend or parent, 'We need to be recycling.' I would get it done in the week. I would do it, we'd read the article, we'd talk about text features, we'd look for the cause and effect and key words, we'd map it and do it."

Along similar lines, a teacher said: "It needs to be something that can take up some of our reading time. … If they [teachers] can present science to their students during their reading time they're covering both ends. They're bringing in the science and they're still doing reading." "One of the biggest differences between the old

standards and the new standards," said another "is trying to bring in social studies and science into our writing and into our reading and synthesizing."

Because research is emphasized as part of the Common Core, teachers recommended that kids do research directly on the Environmental Defenders website and suggested the site include a lesson plan that says "Learn about what happens to dolphins from pollution." Students could go to the "Research" tab on the Environmental Defenders website to research the answers.

"Instead of spoon-feeding the kids, I think kids are inquisitive," said one teacher. "They want to do a lot of their own research. They don't do it because it's very difficult for them to research. If we make the research easy for them and they either pose their own questions or we pose the questions for them, they research it."

Several teachers were also very enthusiastic about using Pinterest as a research tool for themselves and potentially for students. Teachers are using it to collect information in categories relevant to their teaching such as science and food. "The kids can pin it," one teacher said. "If they're doing a report on sharks and the polluted water and they like something, they can pin it or snapshot it and be able to access it later. They can gather their research and print it."

Because the Common Core calls for writing and critical thinking, teachers are looking for sites that move away from multiple choice, where students can write on a form and reflect their own thinking. Teachers said students might be asked to write sentences that "compare two cool videos" or ask them to "write a sentence answering the question: What would you do in this situation?"

Teachers also expressed interest in collaborative activities that could be posted online so students could share what they create. Teachers suggested "Google docs," a "discussion board," and making "a video that students could share with friends." One teacher said she wanted a place where students could "post something," "to do something real, something that matters, not just writing worksheets that get thrown away."

The point is that teachers would be more likely to use the website if they saw it not just as a way to reinforce the direct lessons from the assembly, but as a way of meeting Common Core requirements through games and interactive learning opportunities.

Website Evaluation for Responses

In addition to asking for verbal responses to participants' reactions to the website, all participants were asked to fill out a website evaluation form. The responses compiled below suggest that principals and teachers found the website relatively easy to navigate, but found the content less satisfactory and only 17 percent were likely to recommend the site to others.

	Definitely not				Definitely
Easy to navigate		3%	21%	21%	55%
Useful information		10%	36%	36%	18%
Tell others	3%	21%	34%	24%	17%

Things you like about the website

Pasadena

- Ease of use, easy to navigate
- It has a lot of information about the environment
- Science framework listed
- Integrated curricular connections
- Electronic request form
- Can print form without a login
- Short and to the point
- There are a few multimedia elements
- Included the video
- Download of lyrics
- Activity book
- Full lesson plan
- Dictionary of environmental terms is very helpful
- The preassembly material tech sheets resources are good
- Materials you can download
- Classroom activities (tip sheet)
- Simple to book
- Optional pre-lessons (but small likelihood of being used because activities are so long)

LAX

- Easy to navigate
- Downloadable activities and materials to use
- Love the certificate of participation
- Lessons for various grade levels
- Dictionary of environmental terms
- Pre-assembly lesson plan and sample lesson plans
- Standards listed
- Tip sheets
- Environmental resources link
- Can't miss where to book. Scheduling seems easy even had phone number
- Video is energetic. The student actors unenthusiastic. Video shows the general theme in spirit of the assembly.
- Flyer is available for download

Things you do not like about the website or would like to see changed

Pasadena

- Needs to be updated for Common Core
- Dull. Should be a little more colorful, animated and interactive even for adults.
- Needs less text and more visuals/diagrams
- Needs reason for teachers to want to use this site
- Outdated
- Won't attract students' attention
- I would associate DPW as not "school friendly"
- Too much reading material in Resource Packet
- Lesson plan needs to be more interesting
- The video screen should give me an option to enlarge it
- Assembly should be grade level
- It is not appealing
- Need to be more substantive
- I'd like to hear a clip of the video so I can hear the terminology. Will K-2 kids understand?
- Would like to see bullets as opposed to paragraphs to read
- Too much information
- What can I do to follow up and really help our environment

LAX

- The lesson plans are dense and need to be streamlined
- Preassembly materials must be standards-based
- Tell me how long the video is
- Search button does not take me to other parts of website just brings me to PDF links that aren't always what I am looking for to many link choices
- Colorful slightly bigger font on icons. Environmental Defenders logo should be larger. Lesson plans by grade level.
- Some parts are very wordy
- Have the kids and teacher sites on homepage
- Have a quick and easy link to grade levels and lesson plans
- More graphics for links to other sites
- Maybe needs to be more academically enriched with assignments rather than just worksheets and sheets to read. Boring.
- The content could be more rigorous. Link it to Common Core standards for teachers to buy into it.
- The word FREE should stand out
- There does not seem to be anything interactive for the students
- Needs a few more endorsements or reasons for me to schedule it. Public Works doesn't thrill me necessarily.

Does this website give you the information you need to decide whether to book this assembly or ask your principal to book it? What else should it tell you to help you decide?

Pasadena

YES: I really like the environmental resource section

NO:

- It needs motivation/rationale. Why?
- Incentives
- Needs to provide a more powerful curriculum to capture teacher/student interest
- I need to know a personal reference
- Science standards or Common Core
- Opportunities for student interaction during assembly
- Informative but not enticing
- Link to Common Core

- I'd like it to have grade level tabs
- I would not book for upper grades might be okay for K-1

LAX

YES:

- Maybe if I get a preview of the assembly. A little more detail on assembly content would be nice.

NO:

- The "What is it?" page needs to summarize what students will take away from this
- Pricing should say free nice and big to appeal to school staff.
- Can assembly be performed outside?

Any pages you dislike or think should be changed?

Pasadena

- Graphics outdated/drawing could be better. It needs to be more animated and more colorful
- More multimedia for teacher use in lessons
- Student activity book needs activities that provide more science learning
- Easy to navigate away
- Tool bar at top too easy to hit
- Connect to curriculum
- Be able to schedule online rather than on phone
- Phone number should be bolder
- Eliminate the online services tab
- I'd like to see follow-up activities like recycling program
- The website should be it's own website for teachers and educators
- Dislike the homepage. Too many drop-down menus that don't relate to education
- The projects are geared towards elementary. The activity book is too childish not age-appropriate what's good for K-2 is not good for 3-5 or vice versa.
- Video needs to be updated.
- "What is it?" Section too wordy. Add bullet points.

- Projects are deceiving. I thought it would offer projects for kids to do like recycle art.

LAX

- Home button up top goes to Department of Public Works page not school page
- Not interested in reading about PDFs that aren't about education
- The PDF is difficult to navigate
- Links to lessons would be helpful and more projects/activities
- The video is great! But small
- You must show how standards are addressed
- On the homepage there should be a teachers' site and kids' site available. It's hard to get to teacher site.
- Teacher resources print is very small
- Update activity books
- The printout version is very clear but you don't know that until it is printed out.
- Are kids going to be brought up on stage? They would like that
- Show different video clips illustrating different parts of the assembly

GOODWIN SIMON STRATEGIC RESEARCH

Recommendations for Designing an Environmental Defenders Website

Findings from Five Focus Groups on Elementary Students' Website Use and Preferences

Prepared for Rogers Finn Partners
1/10/2013

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 Overview

1.1 Goals and Motivation for This Study

Rogers Partners asked Goodwin Simon Strategic Research to conduct focus groups with elementary school students in Los Angeles County to assist in the development of a student website intended to support LA County's Environmental Defenders Program.

1.2 Specific Research Questions

In this report, we first present our methodology and outline our key findings and recommendations. We then report in detail the results from parent surveys administered before the focus groups, student surveys administered during the focus groups, and findings from the focus group discussions.

Specifically, we describe the characteristics of student Internet use, including time spent on the Internet and modes for accessing the Internet. We then summarize the websites students visit and the features they value in those websites. In the next section, we present the results from the focus group website trials. We compare student ratings of the sample websites and then provide profiles of each site, in which we discuss student feedback. Lastly, we report on student reactions to two prototypes for an Environmental Defenders character.

2 Methodology

2.1 Student Sample and Recruitment

We held five focus groups with 4th and 5th grade boys and girls. The students recruited came from different areas of Los Angeles County and represented diverse demographic backgrounds. There was variation in household income, ethnicity, and type of school attended (private or public). Table 2.1 shows the number of participants in each of the five focus groups by gender and grade.

Table 2.1 Focus Group Participants

Date	Girls	Boys	4th Grade	5th Grade
1) November 16th (pilot)	3	3	3	3
2) November 19th	6		3	3
3) November 19th		6	3	3
4) November 23rd	6		3	3
5) November 23rd		6	2	4
Total	**15 girls**	**15 boys**	**14 4th-graders**	**16 5th-graders**

Students were recruited from lists maintained by House of Marketing in Pasadena, the facility which hosted the groups. We contacted parents, and after establishing the purpose of the call, we asked for their permission to speak with their children. Children were screened to ensure that they spend at least two hours a week on the Internet. We established quotas for grade 4 or 5, gender, family income, and race/ethnicity to ensure the diversity of the participants.

2.2 Surveys

Two surveys were administered to parents, one at the time of recruitment, and another on the day of the focus groups. Thirty-six parents completed the recruitment survey, including six whose children did not ultimately participate in the focus group. Only 28 parents completed the second survey, as it was not administered during the pilot focus group.

2.3 Focus Group Procedures

To assist Rogers Finn Partners in developing a student website to complement the Environmental Defenders Assembly, the focus groups served three purposes:

1. To understand the ways in which 4th and 5th grade students in Los Angeles County use the Internet.
2. To explore what kind of websites they visit and discuss what they like about those sites.
3. To get their feedback about specific types of web-based applications.

Each focus group lasted 60 minutes and was structured into four sections:

1. An introduction to the session
2. A group discussion
3. Pairs of participants exploring and rating five websites and web-based applications[1]
4. A wrap-up to close the session

The discussions were recorded and later transcribed. The tone for the sessions was casual and fun. Students were allowed to contribute and share their experiences and ideas. A primary adult facilitator ran the group, while two additional facilitators took notes and observed pairs of students at the computers, rating their interaction, engagement, and ease of using each website.

The primary facilitator was Dr. Matthew Lewis, who is a Senior Research Scientist at the RAND Corporation. He was assisted by Ms. Beth Katz and Ms. Amanda Edelman, who are Ph.D. candidates at the Pardee RAND Graduate School. Ms. Katz was the primary author of this report.

The following games and websites were visited by the students during the focus groups and will be described in greater detail later in this report:[2]

[1] After the pilot focus group, we decreased the number of trial websites from six to five.
[2] Math Man and Number Jeopardy were only played by the pilot focus group. The Music Mixer site was not presented to the pilot focus group.

- Recycle Roundup, National Geographic
- Crazy Taxi, Cool Math Games
- Pyramid Panic, BrainPop
- Music Mixer, National Geographic
- Raceway Number Values, Abcya
- Math Man, Cool Math Games
- Number Jeopardy, Quia

After students visited each website, they were asked the following questions and provided responses on a four-point scale, with 1 being the most favorable rating and 4 being the least favorable rating:

1. Did the website look like a good site?[3]
2. How easy was it to figure out how to use the website?
3. How much fun was this site?
4. Would you tell a friend about this website?

After exploring all the websites, students were asked to assign each site with a number from 1 to 10, where 1 would represent a really bad website, and 10 would represent the best website possible. Students were not asked to rank the websites relative to each other; thus, they were able to assign the same number rating to multiple sites, should they choose to do so.

2.4 LIMITATIONS

We should note that there are limitations to the focus group data. We did not have a random sample of students. Instead, students were chosen purposively to give us a sample that was representative of the range of demographic characteristics in Los Angeles County. We cannot conclude that the answers given by our sample of students would match the entire population of students in LA County. For example, our participants were screened to ensure they were all comfortable with Internet access and applications. But as we heard in subsequent focus groups with teachers and principals, many students in lower income areas of the County do not have extensive access to or experience with the Internet. Still, the focus group surveys and responses are quite useful as they do give us a sense of the range of student characteristics and preferences that we might observe in the larger population of elementary school students with access to the Internet.

Student responses in any group may be biased or influenced by their peers. In addition, we cannot interpret the omission of a website in any group to mean that those students have not used it or do not like it. We rely only on the websites students remember to mention during our short discussion. We expect that the responses given by students represent the websites they visit most frequently.

[3] This question was added after the pilot focus group and therefore only received responses from 24 students.

3 KEY FINDINGS AND RECOMMENDATIONS

The student focus groups gave us much insight into the ways in which 4th and 5th grade students access the Internet, how they use the Internet, and their preferences for Internet-based games and applications. We found that students in this age group are very comfortable with navigating the Internet and do so on a regular basis. Furthermore, they are excited about visiting new websites and playing games. Our key findings are summarized below.

3.1 CHARACTERISTICS OF INTERNET USE

- **The students who participated in these focus groups are regular Internet users and are comfortable with exploring new websites.** They all have access to the Internet at home and also use the Internet at school, but to a lesser extent. Though there is a wide range in time spent on the Internet, these students spend at least two hours on the web each week. Their Internet privileges may be limited by parents or granted as a reward for completing other tasks.

- **Students utilize the Internet for both homework and non-homework activities.** Students are familiar with educational websites. Because of age restrictions, most do not use the Internet for email. Parents may also restrict access to certain types of websites, such as search engines and multi-player games.

- **Students use a variety of devices to access the Internet.** Though homework is generally completed using computers, students use both computers and mobile devices (most commonly tablets) for non-homework activities.

- **Students have varying degrees of competency and comfort with computer hardware and may be uncomfortable with the keyboard.** Student motivation and engagement is negatively impacted if they have difficulty maneuvering objects and characters. Some students were more comfortable with the mouse than the keyboard arrows. Students had difficulty with a website (Number Jeopardy) that required them to type in their answers. Many (but not all) students also dislike websites that teach students to type, which are often assigned by teachers at school. These sites typically require students to type words that appear on the screen as quickly and accurately as possible. One student did not know where to find the space bar, thus we can expect that there are other students just as unfamiliar with keyboards. Another had difficult using a mouse; it is likely that he is accustomed to using touch screens. This may become an increasing problem as mobile devices become more ubiquitous.

- **Students find out about websites by talking to friends, following links from television shows and other websites, and by using search engines.** They are likely to share "cool" websites with friends.

3.2 Website Preferences

- **Common features of the websites students like include:**
  - The ability to create and customize
  - Adventure and challenges
  - Variety
  - Games

- **Gender Differences.** There are some important gender differences in website preferences that should be considered.
  - ***Girls expressed greater preference for:***
    - Art and design
    - Music
    - Networking with friends
    - Animals
    - Lifestyle and virtual reality
    - Realistic characters

  - ***Boys expressed greater preference for:***
    - Rewards
    - Action
    - Levels and updates
    - Anything similar to Minecraft
    - Cartoon characters

- **Learning and Feedback.** Students like websites that help them learn, but dislike sites that are too easy or too hard. Students need feedback and reinforcement to master the educational content and rewards or other payoffs to keep them motivated. To be an effective educational tool, the educational purpose of a website and its activities should be made clear upfront and continually reinforced. It would be helpful if instructions clearly explained how the game or activity relates to what students are learning. Otherwise, students may focus on "fun" aspects and ignore the educational content altogether.

- **Challenge.** An appropriate level of challenge in both the required skills and educational content is essential. Some degree of challenge keeps students engaged, but students may give up on a game if the content or required skills are too difficult. Perceptions of challenge may be influenced by students' prior knowledge of the educational content or experience with similar games or websites. If a game is fun and engaging, students will persist through challenges and figure out how to play through trial and error. When students feel that the level of challenge is appropriate, they enjoy being under a time constraint to answer questions or win a race.

- **Music.** Students like to use the Internet to listen to music. Many students were unfamiliar with the term "music mixing," but they did respond positively to the idea of creating music.

Though they had limited time to explore all the features of the National Geographic Music Mixer, their feedback was mostly positive. Girls chose it as their favorite site and only one group of boys gave the site low ratings. This may be due to the challenging nature of the application.

- **Appearance and Engagement.** Students prefer sites that are not too cluttered and have clear images. They are drawn to bright colors and funny objects and characters. They also enjoy sites that play music. Silly or funny items can increase student interest in a game. Girls like animals and characters that look real. Boys like websites that have a creepy, scary, or gross factor, but these can make girls become less interested.

- **Environmental Themes.** Some students are motivated by environmental themes, as seen in students' initial reactions to the Recycle Roundup game. Many students said they like the idea of helping the Earth, though the level of interest varied across students. However, a website that is obviously focused on environmental themes can turn students off if it does not include other characteristics that they like to see in websites.

- **Instructions.** Students need clear and concise instructions that are easy to find and access during a game. Instructions should be displayed in small paragraphs; students should not have to scroll down the page to read all the instructions. Students may ignore or gloss-over instructions provided on a website's homepage, or they may need additional help even after reading the instructions. Therefore, it is useful to have help buttons that students can access while they are engaging with a web-based application. Otherwise, students may give up or miss key features of the activity.

3.3 Exemplary Websites

A few websites stood out as exemplars of what students like. The following websites were commonly mentioned as students' favorites and include many of the characteristics described in the previous section. Rogers Finn Partners may want to look at these sites as models when developing applications for the Environmental Defenders website.

- **Minecraft.** (https://minecraft.net) Boys and girls alike cited this as a favorite website. Minecraft allows students to construct objects using blocks as they explore and create virtual worlds. Students can collaborate with other players to build worlds or fight for survival. The adventure game offers a variety of worlds to explore, and varying levels of challenge, which keep students engaged.

- **Cool Math Games.** (http://www.coolmath-games.com) This is an exemplary educational website. Students can choose from over 350 games to practice specific concepts in mathematics and other fields. Students can select the appropriate level of challenge. There are also puzzles, coloring pages, and mazes. Thus, this site appeals to a wide audience. The homepage is bright and engaging and advertises the types of games students can choose to play. Students access this website in school and at home.

- **Poptropica.** (http://www.poptropica.com) Students create an avatar that they use to explore different islands where they face challenges and solve mysteries. Students can customize their characters with costumes. They also get a homepage that tracks which islands they have been to and which costumes they have used. This personalized feature keeps kids invested in the site. The site also allows kids to watch videos and read digital books and comics. There is also a multi-player feature where they can compete against other kids.

- **Disney XD.** (http://disneyxd.disney.com) This site offers games, videos, and live streaming of TV shows. The homepage has a changing banner that advertises new or featured components. Kids can also download mobile apps, which allow them to play games on mobile devices. With over 100 games to choose from, students have numerous opportunities to explore new content. Several students specifically mentioned "The World's Hardest Game." The title conveys an exciting amount of challenge, almost like a "dare."

- **YouTube**. (http://www.youtube.com) Students enjoy YouTube because it offers endless amounts of exploration. They like the ability to search for anything and watch videos. They follow links to other videos or other websites, which keeps them entertained. The Environmental Defenders website could use videos with links to direct students to various features of the website.

3.4 RECOMMENDATIONS

An Environmental Defenders website will need to compete with the numerous other websites students like to access. The site will need to be attractive, engaging, easy to use, and educational, and provide an appropriate level of challenge. Rogers Finn Partners should consider the following when designing an Environmental Defenders website:

- **A website should be compatible with multiple devices, especially laptops and tablets.** This will ensure that students can access the Environmental Defenders website at school and at home, and that they will not be limited by lack of proficiency with any specific hardware, such as a keyboard or a mouse. Students will likely be more successful answering questions in a game if they do not need to type-in their answers.

- **The following features could help keep students engaged in an Environmental Defenders website that will offer a number of activities, including videos, games, and a music mixing feature:**

    - **Customization.** Students are immediately excited when they realize they can customize something. When one pair of boys saw the word "customize" in the instructions for a game, they were immediately excited. Since customization is central to a music mixing website, students are likely to find it engaging. A music mixing site should allow students to customize or design features other than just the music, such as characters and instruments.

- **Variety and Games.** A website needs variety to keep students engaged and get them to return to the site on multiple occasions. This may include leveling up, updates, alternating a quiz section with a game, or choosing different scenes to play in. Students enjoy watching videos and are likely to follow links presented at the conclusion of videos.

- **Feedback and Rewards.** An educational game needs to keep students motivated with desirable payoffs. Students want immediate feedback on whether or not they choose the right answer or do something correctly. If a game aspect of a website does not reinforce the targeted content and skills, then the educational value is limited. Possible rewards in a music mixing application could include new characters, beats, or instruments for students to use.

- **An Environmental Defenders music mixing application should be designed and branded to both capture students' attention and clearly convey what "music mixing" is.** When branding and advertising the site, it is important to consider that students may be unfamiliar with the term "music mixing." The homepage should succinctly convey the purpose of the application, and may want to emphasize the "customization" aspect. It is important to include aspects that appeal to both boys and girls, especially since a music mixing application may be more appealing to girls at first. The homepage should be colorful and possibly incorporate funny or cartoon-like images. Additionally, the Environmental Defenders characters should have some realistic characteristics and look "cool."

- **A music mixing application should have clear instructions that are concise and accessible beyond the first page of the website.** Students do like learning on the Internet, but they need clear instruction to stay engaged with an educational website. Students had difficulty with the National Geographic Music Mixer website and were not aware of all the features they could play with. Consider presenting the initial instructions in short paragraphs – without requiring students to scroll down the page – and also including "help boxes" near the different features of the application.

- **An Environmental Defenders website should provide an appropriate level of challenge to engage students with varying degrees of prior knowledge about environmental topics.** Challenge helps keep students engaged. If a web application is too easy or too hard, students may become disengaged. A website should not assume students have the prior knowledge necessary to be successful with a game or application and should provide instruction when needed.

- **Consider including a networking aspect that allows students to share their work with friends.** Perhaps students can download their music creation or bring something else they made on the website, such as art or a character, to share with their classmates. It may be possible to take advantage of class websites that are run by teachers, which allow students

to post and collaborate. Girls especially like to share their music with friends and be rewarded for their work.

- **A mission or adventure oriented site would appeal to both boys and girls.** Consider framing the Environmental Defenders website as a large mission or adventure for students to explore. Each activity could have its own "mission statement," and by completing each mission, students would help save the world from toxic waste or other dangers. As it may be more difficult to engage boys in the site than girls, consider emphasizing the "gross" aspect of environmental contaminants and toxic waste. During the focus groups, boys especially enjoyed the "creepy factor" in the Pyramid Panic game, and boys and girls alike loved the dirty diaper that fell from the sky in Recycle Roundup.

4 INTERNET USE

4.1 CHARACTERISTICS OF INTERNET USE

4.1.1 KEY TAKEAWAYS

- All students in our groups have access to the Internet at home and spend several hours on the Internet each week. However, there is a large range in weekly Internet use and students with many non-school activities may spend less time on the Internet.
- A website should be compatible with computers and with mobile devices, as students use a variety of devices to access the Internet.
- A website should not require an email address, as most students do not use email.
- Time spent on the Internet may be restricted by parents or granted as a reward for completing school work or other tasks. Parents may also restrict access to certain types of websites, such as search engines or multi-player games.

4.1.2 DATA SOURCES AND TRENDS

We gathered data on student Internet usage from three sources:

1. A survey completed at the time of recruitment[4]
2. A parent survey completed on the day of the focus group[5]
3. Student responses during the focus group

Though responses were not identical across all three sources, even for the same student, clear trends emerged in the data:

- One hundred percent of parents reported having broadband Internet access at home.

[4] The pre-survey was administered to all 36 candidate students, while only 30 students ultimately participated in the focus groups.
[5] Twenty-eight parent surveys were completed. The parent survey was not administered during the pilot focus group.

- Time spent on the Internet varies greatly across all students, with a median amount of 8 hours per week.
- There are few meaningful gender differences in Internet usage.
- Students tend to use the Internet by themselves, but also like to connect with friends through websites.
- A large majority of students have access to mobile devices for Internet use.
- Students complete homework assignments mostly using computers, but use both computers and mobile devices to access the Internet for non-homework activities.
- A minority of students use email regularly.

We discuss these trends further in the following sections.

4.1.3 Time Spent on the Internet

Students generally reported using the Internet by themselves. However, they do like being able to connect to and interact with their friends through games or message boards. Table 4.1 displays how much time students spend on the Internet each week. Total weekly Internet use ranged from 2 hours to 28 hours. In the surveys, the average use for girls was greater than the average use for boys. However, the focus groups suggested the reverse. Overall, the median hours spent on the Internet was nearly identical for girls and boys, which leads us to assume that there are no meaningful differences in Internet usage. The median weekly Internet use across all students is 8 hours. During the focus groups, several girls reported having many weekend activities that prevented them from using the Internet. They spent more time on the Internet during the week, while other students reported spending more time on the Internet during the weekend.

Table 4.1 Weekly Internet Use

	All	Girls	Boys
Average hours/week	10.7	11.8	9.5
Median hours/week	8	8.25	8.0
Minimum hours/week	2	2	3
Maximum hours/week	28	28	25
Percent of students with time limit for non-homework Internet use at home	86 percent	100 percent	71 percent

Source: Average results from both surveys (N=36 for pre-survey and N=28 for parent survey).

Few students explicitly reported spending time on the Internet for homework. (The focus group conversations focused mostly about how they use the Internet for fun.) However, the overwhelming majority of parents (89 percent) reported that their children use the Internet to complete homework assignments. That percent increased to 100 percent for girls.

Survey results indicated that 86 percent of parents reported that their children have limits for their weekly Internet usage for non-homework activities at home. However, the limits reported by parents spanned a wide range and were often less than the actual number of hours reported on the

pre-survey. Although that discrepancy may be explained by additional Internet use for homework or at school, it is still unclear how strictly these limits are enforced. Interestingly, 100 percent of the parents of girls reported setting limits, while only 71 percent reported limits for boys. When students were asked if they had rules for Internet use at home, almost no one reported having a time limit. The few students that reported rules noted that parents may limit how long they can use a specific device or may monitor what their children are doing. Internet use may be a privilege or a reward for completing homework or staying on task at school, which may then be taken away. Some of these students reported having restrictions on specific types of websites, such as search engines, like Google. One student noted that he is not allowed to talk to other players when engaging in multi-player games.

4.1.4 How Students Access the Internet

According to the pre-surveys, all students who participated in the focus groups have access to broadband Internet at home, 81 percent use the Internet at school, 67 percent use the Internet at houses of friends or family, and only 56 percent access the Internet at libraries. Parents reported that just over half their children have their own computers and less than half have an email address that they use on a regular basis. Girls were more likely to use an email address than were boys (43 percent for girls and 36 percent for boys). Thus, an Environmental Defenders website that requires an email address would potentially exclude many kids.

Students access the Internet using a variety of devices. See Table 4.2 for parent responses about their children's access to different devices. There is some variation across gender, with boys having greater access to smart phones and tablets than girls.

Table 4.2 Devices Used to Access the Internet

	Total	Girls	Boys
Access to a smart phone to go online	**86 percent**	71 percent	100 percent
Access to a tablet	**82 percent**	79 percent	86 percent
Access to and iPod Touch	**43 percent**	43 percent	43 percent
Child has his/her own computer	**54 percent**	57 percent	50 percent

Source: Parent surveys (N=28).

Devices are used for different purposes. See Table 4.3 for a breakdown of devices used for homework and non-homework activities. According to parents, homework is generally completed using computers. Only 20 percent reported that their students complete homework primarily with a mobile device. Among those parents, 80 percent reported that their students do not have their

own computers to use at home. Internet use for non-homework activities is split between computers and mobile devices.

Table 4.3 Devices Most Frequently Used for Homework and Non-Homework Activities

	Homework activities	Non-homework activities
Computer	80 percent	46 percent
Mobile device	20 percent	43 percent
Both		11 percent

Source: Parent surveys (N=28).

During the focus groups, the use of laptops[6] was more common than other devices. Students like the big screen and reported using laptops for homework. After laptops, tablets were the most common device mentioned (iPads and Kindle Fire were explicitly mentioned). Students use tablets for games, texting, and watching videos with friends. They like that tablets are smaller and portable. A few students reported having access to iPads at school. Students also reported using iPods and smartphones for texting. A few students have their own phones, but most do not.

4.2 Websites Students Visit

4.2.1 Key Takeaways

- All students like to play games on the Internet.
- Students find websites through Internet searches, links from television shows and other websites, and word-of-mouth.
- Students value the ability to customize features of a website. They also like websites that involve adventure, challenges, action, and creativity.
- Students find some educational websites fun and they enjoy learning, but dislike sites that are too easy or too hard.
- There are some significant gender differences in website preferences.
    - Boys expressed greater preference for sports and action, whereas girls were more inclined to prefer art and design sites.
    - Boys especially like to level-up and get feedback and rewards, like avatars.
    - Girls prefer realistic characters; they want to explore virtual worlds and connect with their real world friends.
- Many students are unfamiliar with the term "music mixing," but did like the idea of creating their own music.
- Students gave mixed reactions to descriptions of hypothetical environmentally themed websites.
- Students are allowed to access some websites in school.

[6] During the discussion, the distinction between laptops and desktops was not always clear.

4.2.2 *Finding Websites*

Students were asked how they discover cool websites to visit. They provided several responses:

- Television shows (e.g. Nickelodeon, Cartoon Website) will provide links to sponsors' websites.
- Other websites (e.g. YouTube) may provide links or include links in advertisements.
- Friends, word-of-mouth, and sometimes through texts and emails.
- Internet search engines (e.g. Google) – students may search for phrases like "fun games" or "animal games," and the search engine will return links.
- App Store – students will download apps based on pictures shown in the App Store.
- Teachers may show them sites they can try at home.
- Libraries may advertise websites (mentioned in one group).

4.2.3 *Favorite Websites*

Students mentioned many websites and games during the focus groups. It should be noted that omission of a site in a particular focus group does not indicate that those students dislike the site. The following list includes all of the websites mentioned. The most popular are highlighted in green.

- Animal Jam
- Call of Duty
- Call of Duty Ghost
- Cartoon Network
- Club Penguin
- **Cool Math Games**
- Deep See Leap
- Dictionary.com
- **Disney XD**
- Edmodo
- Fantage
- Fun Brain
- Girls Go Game
- Google
- Iheartradio
- Instagram
- Interactive.webly
- iXL
- Jelly Car 2
- Khan Academy
- Lego.com
- Mathlive
- **Minecraft**
- **Moshi Monsters**
- **Movie Star Planet**
- National Geographic
- Netflix
- Nickelodeon
- Pandora
- **Poptropica**
- Roleblock
- ScribbleOns
- Shutterfly
- Spelling City
- Star Falls
- **Subway Surfer**
- The Hardest Game in the World (on Cool Math)
- Temple Run
- Tickettoread
- Tobuscus (on YouTube)
- Type to Learn 3
- VMathLive

4.2.4 TYPES OF WEBSITES

We asked students about different types of websites, including games, music, and art and design sites. We also proposed ideas for websites and asked students for feedback.

Games

Though not every student identified as a "gamer," all students liked to play games on the Internet. Action was a common feature mentioned. Boys were more likely to enjoy sports and violent games. They mentioned soccer, Call of Duty, and sports games played on video consoles, such as Madden and NBA 2K3. One boy specifically mentioned "search and destroy" games. Boys were also more likely to enjoy "catch the bad guy" games. One girl said that "girls don't like doing that," and that instead, "they like to get points and go on missions." Interestingly, when the facilitator added the caveat that the bad guy was "wasting electricity," the students were either less or no longer interested in that type of game. Similarly, when the facilitator asked girls if they would enjoy a game where they have to drive a truck and run over items that could be recycled, they were not very excited.

Girls mentioned playing card games and games with memory challenges. When girls were asked about mazes and puzzles, they gave lukewarm responses. Feedback was also mixed when students were asked about quiz style games. Both boys and girls like role-playing and creative games, such as Minecraft and Survivor. They like to use their imaginations to make things, or design parts of the game, like houses. One boy added that "leveling up" is important because it opens new worlds to explore and it allows them to get better weapons and other "cool stuff." Other boys agreed, although one boy said he does not level up because it costs money.

Girls listed several other game websites they frequently visit, including:

- Poptropica: A role-playing game that involves challenges on different islands and has multi-player features.
- Subway Surfer: A girl spray paints a subway train, guards chase her, and she has to jump on trains and boxes.
- Typing websites: Practice typing and win by typing words correctly and as quickly as possible.
- Deep Sea Leap: Throw an arrow at SpongeBob, jump to land on the broken wood, and then get to the top to win.
- Fantage: Can choose a character/avatar and talk to people on the Internet.
- Animal Jam (National Geographic): Play the role of an animal and talk to other people.

Music

Most students liked to listen to music on the Internet. They use Pandora and iheartradio to stream music. Some students liked the idea of making music, though more girls seemed to like the idea than boys. Many students were not familiar with the term "music mixing;" however, one group of boys was excited about "DJ mixing." Students mentioned websites where they make music by tapping on piano or guitar keys that light up. A few boys said they played Garage Band.

Art and Design

Girls reacted positively to art and design websites. One group was particularly enthusiastic about drawing pictures, with the caveat that they do not like comic strips. One girl described a game where you take a picture and then accessorize it with items like a hat or a mustache. Another liked the website Interactive.weebly, which has holiday themed activities, like folding paper to make a snowflake.

Boys and girls both liked the idea of creating characters and customizing games. This is one of the features that makes Minecraft so popular. Some boys enjoyed other activities where they create art. One mentioned the game Mario versus Donkey Kong, where a player can make things while robots try to stop them. Another liked Jelly Car 2 because he could design his own racetrack. One boy searches for images on Google and then draws them using pen and paper.

Other

Though not exactly a game, students enjoy watching videos and just "surfing the web." They like to type terms into search engines or find random videos on YouTube. One group of boys specifically mentioned Netflix, where they can watch anything they like.

Girls frequently mentioned networking features of sites and sites that allow them to collaborate with friends. Girl Talk is one site where friends can communicate with each other. They like this because sometimes they do not have enough time to talk with their friends during school. One girl made a Shutterfly site with a friend, where they can both post things. Some students have class websites at school that they can post to as well. One girl said that she prefers to play games with friends and not with "robot people."

4.2.5 Least Favorite Websites

We asked a few of the focus groups about their "least favorite" websites. One theme that emerged is that students dislike games that are too easy or too hard. Nick Jr. was given as an example of a website with "baby games." Students disliked "homework websites," although this can be interpreted as disliking homework activities in general. Interestingly, typing websites, which are often assigned at schools to help students learn how to type quickly and with accuracy, were among both the favorite and least favorite games. Though girls enjoy connecting with friends, they did not mention Facebook as a site they use. In fact, one girl disliked Facebook because her mom posted embarrassing pictures of her from when she was a baby.

4.2.6 Internet Use in School and Educational Websites

There was little discussion about the use of Internet in school. Students are generally limited to school sites or educational websites during school hours. Some teachers use the Internet in class, or teachers may take students to the computer lab. Teachers sometimes assign schoolwork or homework on the Internet. Teachers monitor Internet use on school websites. Some classes have their own sites with message rooms. Some students are able to make their own pages associated with class websites. Students may be allowed to play educational games, such as Cool Math Games, when they finish their classwork.

A few of the sites used at school were also identified among the "least favorite websites." As previously discussed, several students mentioned typing websites, which were either loved or hated. They are considered boring by students who already know how to type or who dislike typing in general. Again, students did not like educational websites if they were too easy or too hard.

Other educational websites students visit include:

- Khan Academy
- Typing websites (e.g. Spelling City, Type to Learn 3)
- Websites with eBooks
- Cool Math Games
- Class websites
- Fun Brain
- V Math Live
- iXL

4.2.7 Characteristics of the "Ideal Website"

After students discussed their favorite sites and commented on a variety of website features, they were asked to describe the characteristics of their "ideal website." Many of these characteristics were previously discussed and are summarized in Table 4.4 below:

Table 4.4 Characteristics of the Ideal Website

Preferred by both Girls and Boys	
Create and customize	Students want some degree of control. They want the ability to shape a website, create their own game, and customize characters and other features.
Adventure and challenges	Go on missions and get points.
Variety	Multiple features keep websites interesting. One boy described this as "games mixed with other games," like a combination of Minecraft, Poptropica, and PacMan.
Preferred by Girls	
Art	Draw, design clothes, etc. Several boys also like art.
Music	Girls are excited about listening to and making music. Many boys also enjoy music.
Networking	Girls want to connect with friends over the Internet. They like games played with friends, personal or shared websites, and message rooms.
Animals	Girls like sites where animals are involved in some way, like in games on the National Geographic website.
Lifestyle and virtual reality	An entire world that mirrors what you do in real life, with many activities to choose from (e.g. go to school, do fun activities, go to an amusement park).
Preferred by Boys	
Rewards	Avatars, coins, mini-games, and feedback in general. Several girls appreciate this as well.

Action	Boys want to "do cool stuff," like snowboarding, skiing, racing cars, punching, robbing banks and cars, playing mafia, shooting people, etc. Girls also value action, but to a lesser extent.
Levels and updates	They like reaching new levels and getting new features. Updates keep them wanting to play.
Minecraft	Some boys explicitly mentioned Minecraft as the ideal website and place value on customization and creating things.

5 Results from Focus Group Website Trials

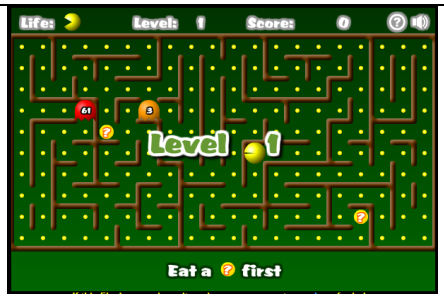
In the following section, we compare the sample websites on overall ratings and across four categories. We then describe student opinions of and reactions to each website in more detail and summarize student feedback on two renderings of an Environmental Defenders character.

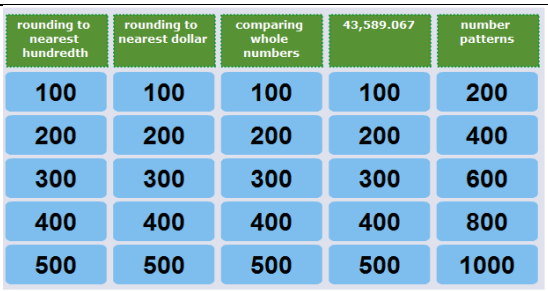
5.1 Sample Websites

We provided seven websites for students to explore, two sites Math Man and Number Jeopardy were only played in the pilot focus group. The Music Mixer was not added until after the pilot focus group. Pairs of students took turns playing the games and had about 5 minutes with each website. Usually, there was only time for one student to control the game, but sometimes the second student was able to get a turn as well. The seven websites are described below in Table 5.1.

Table 5.1 Focus Group Sample Websites

Recycle Roundup, National Geographic Students manipulate a gorilla to collect trash falling from the sky. Students must then place the items into one of three bins: trash/landfill, recycling, and compost/green waste. The game is timed and students get a point for each item that is placed in the correct bin.	 http://kids.nationalgeographic.com/kids/games/actiongames/recycle-roundup/
Crazy Taxi, Cool Math Games This is a timed racing game. Players encounter cars with different numbers while they race and must run into the cars that are multiples of a specific number to earn points. Students also must jump over obstacles that appear on the road.	 http://www.coolmath-games.com/0-crazy-taxi-m12/index.html

Pyramid Panic, BrainPop Players must make a mummy run away from a monster that is chasing it by building steps that match the length of different geometric shapes. The game is timed and they collect gems along the way to earn points.	 http://www.brainpop.com/games/pyramidpanic
Music Mixer, National Geographic Students can create and record music by selecting instruments, music tracks, styles, and special effects. They can also customize the physical characteristics of the band members and the instruments they play.	 http://kids.nationalgeographic.com/kids/games/interactiveadventures/music-mixer/
Raceway Number Values, Abcya Students must correctly compare numbers by placing the "greater than," "less than" or "equals" signs between the two numbers. In successive levels, the numbers have more digits and decimal places, making the game more challenging. After students complete a level by answering a set of questions correctly, they are rewarded with a racing game. They earn points by collecting coins and avoiding oil slicks and other vehicles as they move down the road. The racing component is timed, whereas the questions are not.	 http://media.abcya.com/content/comparing_number_values/comparing_number_values.swf
Math Man, Cool Math Games This game is similar to Pac Man. Players must move Math Man through a maze and only eat the ghosts displaying a number that solves a particular equation, while avoiding the other ghosts.	 http://coolmath-games.com/0-math-man/index.html

Number Jeopardy, Quia This jeopardy-style game can be played by one or two players. Players select questions worth different numbers of points in five categories. The categories relate to whole numbers and decimals, and may include rounding and comparing numbers. Players must type in their answers using the keyboard.	 http://www.quia.com/cb/8142.html

5.2 Website Comparisons

After playing with each website, students were asked the following questions:

1. Did the website look like a good site?[7]
2. How easy was it to figure out how to use the website?
3. How much fun was this site?
4. Would you tell a friend about this website?

Each site received a rating from 1 to 4 for each criterion described above, with 1 being the most favorable rating and 4 being the worst. After exploring all the websites, students were asked to assign each site with a number from 1 to 10, where 1 would represent a really bad website, and 10 would represent the best website possible. Students were not asked to rank the websites relative to each other; thus, they were able to assign the same number rating to multiple sites.

5.2.1 Key Takeaways from Website Comparisons

- Overall, students had fun exploring websites and playing games, and they wanted more time on the computers during the focus groups. In fact, all websites were rated "very fun" or "pretty fun" by a majority of students.
- Students are likely to share websites they enjoy with friends.
- The highest rated site (Crazy Taxi) was also the easiest, but difficult games can receive high ratings if students are motivated enough to persist through challenges. Likewise, games that are easy, but not challenging, may not be perceived as fun.
- In general, boys and girls had similar opinions about and reactions to the websites, with two notable exceptions:
    - The Music Mixer application was generally more appealing to girls. The boys found the game to be very difficult, but they also gave it high ratings when they received guidance from the facilitators. Girls thought that it was the best looking site.
    - Though boys and girls both liked Pyramid Panic, a few girls were turned-off by the "creepy" or "scary" features of the game. Boys, on the other hand, enjoyed the "creepy factor." Both boys and girls like "silly" or "funny" characters or objects.
- Students worked together and helped each other to figure out how to play the games. Their opinions can also be influenced by their peers.

[7] This question was added after the pilot focus group and therefore only received responses from 24 students.

5.2.2 Overall Ratings

Table 5.2 displays the average ratings for each of the sample websites, disaggregated by group and gender. The highest rating given for each group, each gender, and across all participants is highlighted in green, while the lowest ratings are highlighted in red.

Table 5.2 Average of Overall Ratings

	Number of Students	Crazy Taxi	Pyramid Panic	Music Mixer	Raceway Number Values	Math Man	Recycle Roundup	Number Jeopardy	Group average rating
Girls	**15**	**7.5**	**7.1**	**8.1**	**6.6**	**7.7**	**5.3**	**4.3**	**6.7**
11/16/2013	3	8.7	9.7		8.0	7.7	8.7	4.3	7.8
11/19/2013	6	8.2	6.3	8.8	8.0		5.3		7.3
11/23/2013	6	6.2	6.7	7.3	4.5		3.7		5.7
Boys	**15**	**9.1**	**8.1**	**6.6**	**6.2**	**4.7**	**5.5**	**3.3**	**6.2**
11/16/2013	3	9.0	9.7		8.7	4.7	7.0	3.3	7.1
11/19/2013	6	9.0	7.8	3.5	5.2		5.5		6.2
11/23/2013	6	9.2	7.5	9.7	6.0		4.7		7.4
Total	**30**	**8.3**	**7.6**	**7.3**	**6.4**	**6.2**	**5.4**	**3.8**	**6.4**

Note: The 3 girls and 3 boys on November 16th were part of one combined focus group.

Overall, across all 30 students, Crazy Taxi was the highest rated game, with an average rating of 8.3, and Recycle Roundup was the lowest rated game, with an average rating of 5.4. Number Jeopardy actually received a lower average rating of 3.8, but it was only played and rated by six students. Those six students gave the game overall ratings under 5, except for one girl, who gave all the websites an overall score of 10 and also gave each website the highest rating in the individual categories.

Table 5.3 Websites Ranked by Overall Ratings

All Students		**Girls**		**Boys**	
1st	Crazy Taxi	**1st**	Music Mixer	**1st**	Crazy Taxi
2nd	Pyramid Panic	**2nd**	Crazy Taxi	**2nd**	Pyramid Panic
3rd	Music Mixer	**3rd**	Pyramid Panic	**3rd**	Music Mixer
4th	Raceway Number Values	**4th**	Raceway Number Values	**4th**	Raceway Number Values
5th	Recycle Roundup	**5th**	Recycle Roundup	**5th**	Recycle Roundup

Note: This table excludes the two sites that were only evaluated by six students.

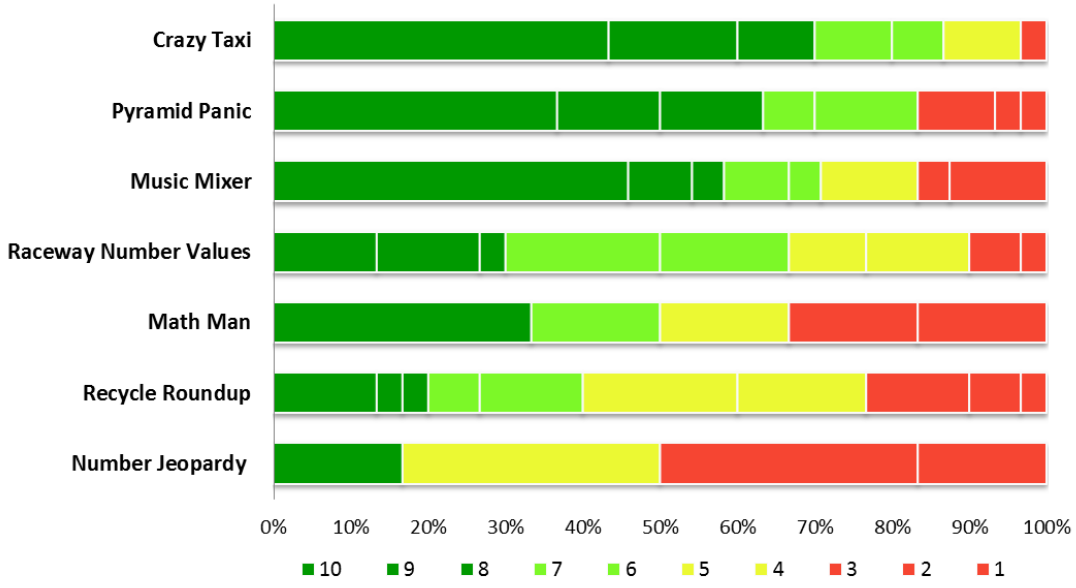
Table 5.3 shows how five games rank overall and by gender. When broken down by gender, the girls groups on November 19th and 23rd gave the highest rating, on average, to the Music Mixer site, and the lowest to Recycle Roundup. Overall, the boys gave the highest rating, on average, to the Crazy Taxi game. Of the five games played in multiple focus groups, Raceway Number Values and

Recycle Roundup were the 4th and 5th ranked, respectively, for both girls and boys. Across all students, Crazy Taxi, Pyramid Panic, and Music Mixer took the top three rankings. However, among the girls, the rankings were slightly different; Music Mixer ranked 1st, Crazy Taxi ranked 2nd, and Pyramid Panic ranked 3rd.

Figure 5.1 displays the distribution of individual student ratings for each website. The area shaded in dark green represents the percentage of students who gave the highest ratings to each site – 10, 9, or 8 – and the area shaded in light green represents the percentage of students who gave ratings of 7 or 6. The area shaded in yellow and red show the percent of students that gave ratings of 5 or below to each site. Red denotes the lowest ratings – 1, 2, or 3. It should be noted that sites were given a range of ratings – both high and low. Each site received the highest rating, 10, and the lowest rating, 1, from at least one student. The one exception is Math Man, which received a minimum rating of 2, but was only played by six students.

As shown in Figure 5.1, Crazy Taxi has the largest proportion of "green" ratings. It also has a median rating of 9. Eighty-seven percent of all students gave the site a rating of 6 or higher, and 43 percent of students gave it the highest rating – 10. Number Jeopardy, which was only played by 6 students, has the largest "red" area. Fifty-percent of those students gave the site a rating of 1 or 2, and 83 percent rated the site at 5 or below. Among the sites visited by all focus groups, Recycle Roundup has the largest proportion of red and yellow ratings. Sixty-percent of students gave Recycle Roundup a rating of 5 or lower. Only 20 percent rated the site at 8 or higher.

Figure 5.1 Distribution of Student Ratings, By Website



Note: Sites were rated by 30 students, except where noted.

There was some variation in ratings across focus groups. Some groups tended to award higher or lower ratings, on average, than the other groups. While the average overall rating for the websites across all groups was 6.4, the group on the November 16th gave the websites an average rating of

7.8, and the group of girls on the November 23rd gave an average rating of 5.7. This suggests that there may be some peer effects; the level of collective excitement about the websites varied across groups and may have influenced the students' ratings. Despite the variation in average ratings, there was general agreement across groups about how the sites compared to one another and which sites were the worst.

One notable difference across groups can be seen by comparing the ratings for the Music Mixer application across the two boys only focus groups. The site received the highest rating in the two girls only focus groups, as well as the focus group with boys on November 23rd. However, the boys in the November 19th focus group rated it the lowest among the sites they tried. This group had significant difficulty with the interface. No instructions were displayed on the webpage and the students were slow to figure out how to navigate the site. As a result, they had little time to explore the features of the application and collectively dismissed the site. On November 23rd, the facilitators provided some initial, but limited guidance to both the boys and girls focus groups. The boys on that date were more engaged with the site and, though they did not have time to explore all the features, they had fun and wanted to spend more time figuring it out. There was collective excitement among that group. Whether this difference is due to the extra guidance or other characteristics of the November 19th and 23rd groups cannot be determined. It is possible that there are some gender differences and peer effects that will influence boys' perceptions of this type of website.

5.2.3 STUDENT RATINGS BY CATEGORY

Website Appearance

Students were asked to rate the appearance of each site on a 4-point scale:

1. Looked very good
2. Looked pretty good
3. Did not look very good
4. Looked bad

Table 5.4 shows how each site ranked in the appearance category. Crazy Taxi received the highest appearance score, while Recycle Roundup received the lowest.

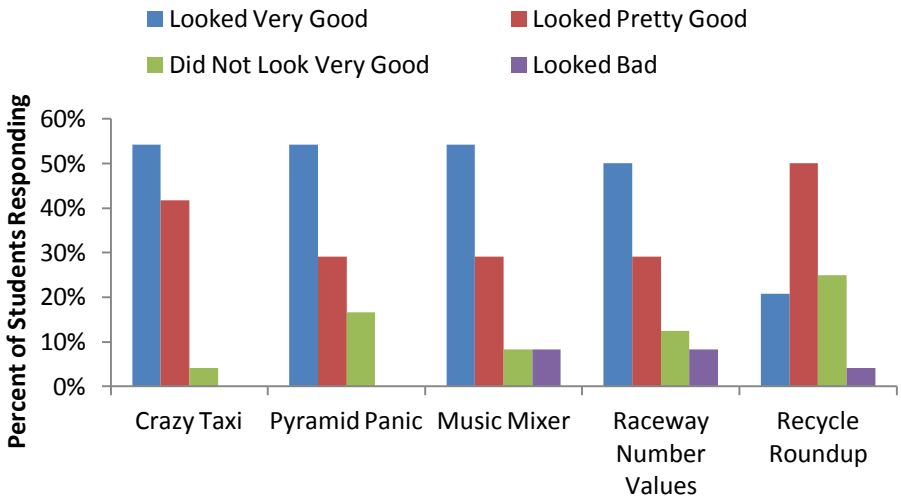
Table 5.4 Average Appearance Scores

Ranking	Website	Mean Score	Number of Ratings
1st	Crazy Taxi	1.5	24
2nd	Pyramid Panic	1.6	24
3rd	Music Mixer	1.7	24
4th	Raceway Number Values	1.8	24
5th	Recycle Roundup	2.1	24

Scale: 1 is best looking; 4 is worst looking.

Figure 5.2 displays the distribution of appearance ratings for each site. In general, students thought the websites looked good. Very few students said a website looked bad. Most websites received ratings of "looked very good" or "pretty good."

Figure 5.2 Distribution of Ratings: Did the website look like a good site?



Note: The total number of students providing ratings is 30, except for the Music Mixer, where N=24.

There were a few gender differences apparent in the appearance scores. Table 5.5 shows how the websites were ranked overall and separately for girls and boys. Girls gave the Music Mixer higher appearance scores than the boys did. A few boys thought that the Music Mixer application looked like it was for girls.

Table 5.5 Websites Ranked by Appearance, by Gender

All Students		**Girls**		**Boys**	
1st	Crazy Taxi	**1st**	Music Mixer	**1st**	Crazy Taxi
2nd	Pyramid Panic	**2nd**	Crazy Taxi*	**2nd**	Pyramid Panic
3rd	Music Mixer	**3rd**	Pyramid Panic*	**3rd**	Raceway Number Values
4th	Raceway Number Values	**4th**	Raceway Number Values	**4th**	Music Mixer*
5th	Recycle Roundup	**5th**	Recycle Roundup	**5th**	Recycle Roundup*

*Denotes a tie

Ease of Use

Students were asked to rate how easy each site was on a 4-point scale:

1. Very easy
2. Pretty easy
3. Not very easy
4. Hard

Table 5.6 shows how each site ranked in the ease of use category. Crazy Taxi was the easiest site and Number Jeopardy was the hardest.

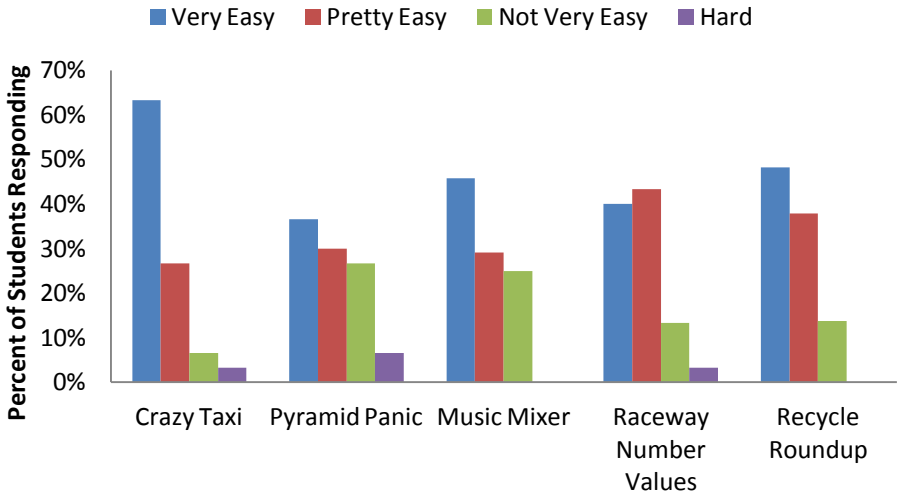
Table 5.6 Average Ease of Use Scores

Ranking	Website	Mean Score	Number of Ratings
1st	Crazy Taxi	1.5	30
2nd	Recycle Roundup	1.7	30
3rd	Math Man	1.7	6
4th	Music Mixer	1.8	24
5th	Raceway Number Values	1.8	30
6th	Pyramid Panic	2.0	30
7th	Number Jeopardy	2.2	6

Scale: 1 is easiest; 4 is hardest

Figure 5.3 displays the distribution of ease of use ratings for each site. Very few students said a website was hard, even though we observed them struggling with several aspects of the applications. Students may be used to exploring and figuring out sites without directions, or know where to look when they need help. Crazy Taxi, which was the overall favorite, also received the most "very easy" ratings. The math content in Crazy Taxi may have been too easy for some students.

Figure 5.3 Distribution of Ratings: How easy was it to figure out how to use the website?



Note: The total number of students providing ratings is 30, except for the Music Mixer, where N=24.

There were a few gender differences apparent in the ease of use scores. Table 5.7 shows how the websites were ranked overall and separately for girls and boys. Both boys and girls struggled with Pyramid Panic. However, girls found the Music Mixer to be the easiest of five sites, whereas boys found it to be the hardest. This gender difference was also present in the appearance ratings.

Table 5.7 Websites Ranked by Ease of Use, by Gender

All Students		**Girls**		**Boys**	
1st	Crazy Taxi	**1st**	Music Mixer	**1st**	Crazy Taxi
2nd	Recycle Roundup	**2nd**	Crazy Taxi	**2nd**	Recycle Roundup
3rd	Music Mixer	**3rd**	Recycle Roundup	**3rd**	Raceway Number Values
4th	Raceway Number Values	**4th**	Raceway Number Values	**4th**	Pyramid Panic
5th	Pyramid Panic	**5th**	Pyramid Panic	**5th**	Music Mixer

Note: Websites played by only 6 students are excluded from this table.

Degree of Fun

Students were asked to rate how fun each site was on a 4-point scale:

1. Very fun
2. Pretty fun
3. Pretty boring
4. Very boring

Table 5.8 shows how each site ranked in the degree of fun category. Crazy Taxi was the most fun site and Number Jeopardy was the least fun site.

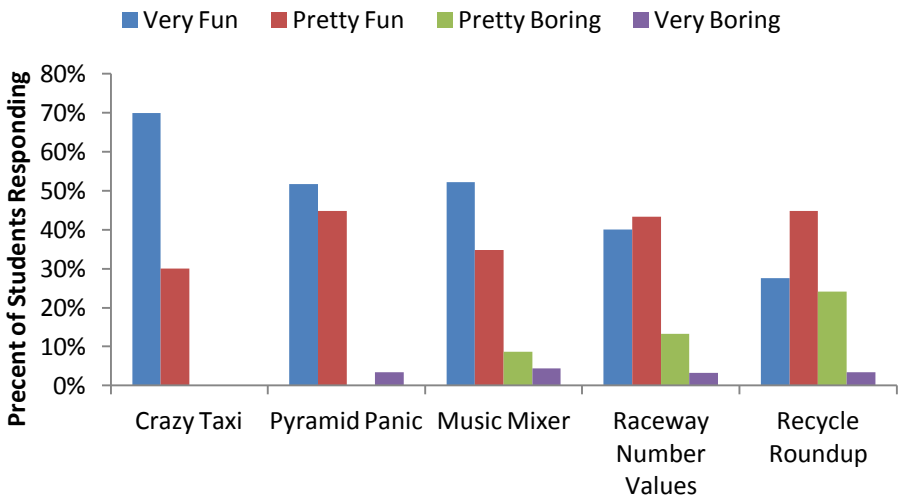
Table 5.8 Average Degree of Fun Scores

Ranking	Website	Mean Score	Number of Ratings
1st	Crazy Taxi	1.3	30
2nd	Pyramid Panic	1.6	30
3rd	Music Mixer	1.7	24
4th	Raceway Number Values	1.8	30
5th	Math Man	1.9	6
6th	Recycle Roundup	2.0	30
7th	Number Jeopardy	2.5	6

Scale: 1 is most fun; 4 is least fun.

Figure 5.4 displays the distribution of degree of fun ratings for each site. Very few students said a website was "very boring." Most students seemed to have at least some fun with each game. Also, there were no gender differences apparent in the degree of fun scores. As Table 5.9 shows, girls and boys rated the games in terms of fun in the same order.

Figure 5.4 Distribution of Ratings: How much fun was this site?



Note: The total number of students providing ratings is 30, except for the Music Mixer, where N=24.

Table 5.9 Websites Ranked by Degree of Fun, by Gender

All Students		Girls		Boys	
1st	Crazy Taxi	**1st**	Crazy Taxi	**1st**	Crazy Taxi
2nd	Pyramid Panic	**2nd**	Pyramid Panic	**2nd**	Pyramid Panic
3rd	Music Mixer	**3rd**	Music Mixer	**3rd**	Music Mixer
4th	Raceway Number Values	**4th**	Raceway Number Values	**4th**	Raceway Number Values
5th	Recycle Roundup	**5th**	Recycle Roundup	**5th**	Recycle Roundup

Note: Websites played by only 6 students are excluded from this table.

Likelihood of Sharing with Friends

Students were asked to rate how likely they were to share the website with friends using a 4-point scale:

1. Definitely would
2. Probably would
3. Probably not
4. Definitely not

Table 5.10 shows how each site ranked according to students' likelihood of sharing the website with friends. Students were most likely to say they would tell their friends about Crazy Taxi and least likely to tell their friends about Recycle Roundup.

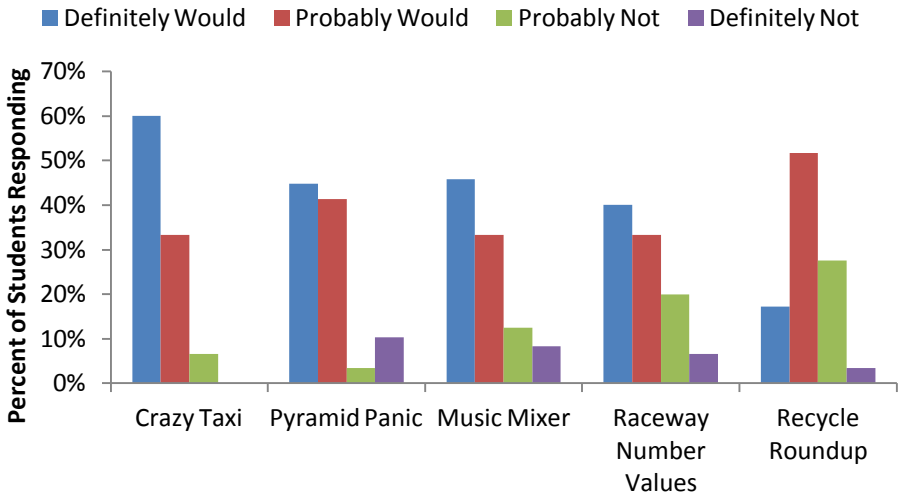
Table 5.10 Average Likelihood of Sharing Scores

Ranking	Website	Mean Score	Number of Ratings
1st	Crazy Taxi	1.5	30
2nd	Pyramid Panic	1.8	30
3rd	Music Mixer	1.8	24
4th	Raceway Number Values	1.9	30
5th	Number Jeopardy	2.0	6
6th	Math Man	2.2	6
7th	Recycle Roundup	2.2	30

Scale: 1 is most likely; 4 is least likely.

Figure 5.5 displays the distribution of student responses to the question: "Would you tell a friend about this website?" Most students responded that they "probably" or "definitely" would share the sites with friends. Recycle Roundup and Raceway Number Values had the highest number of students would "probably" or "definitely" would not share the site with friends.

Figure 5.5 Distribution of Ratings: Would you tell a friend about this website?



Note: The total number of students providing ratings is 30, except for the Music Mixer, where N=24.

The major gender difference in this category is that girls were more likely to share the Music Mixer site with friends than were boys. Table 5.11 shows how the websites were ranked overall and separately for girls and boys.

Table 5.11 Websites Ranked by Likelihood of Sharing, by Gender

All Students		Girls		Boys	
1st	Crazy Taxi	**1st**	Crazy Taxi	**1st**	Crazy Taxi
2nd	Pyramid Panic	**2nd**	Music Mixer	**2nd**	Pyramid Panic
3rd	Music Mixer	**3rd**	Pyramid Panic	**3rd**	Raceway Number Values
4th	Raceway Number Values	**4th**	Raceway Number Values	**4th**	Music Mixer
5th	Recycle Roundup	**5th**	Recycle Roundup	**5th**	Recycle Roundup

Note: Websites played by only 6 students are excluded from this table

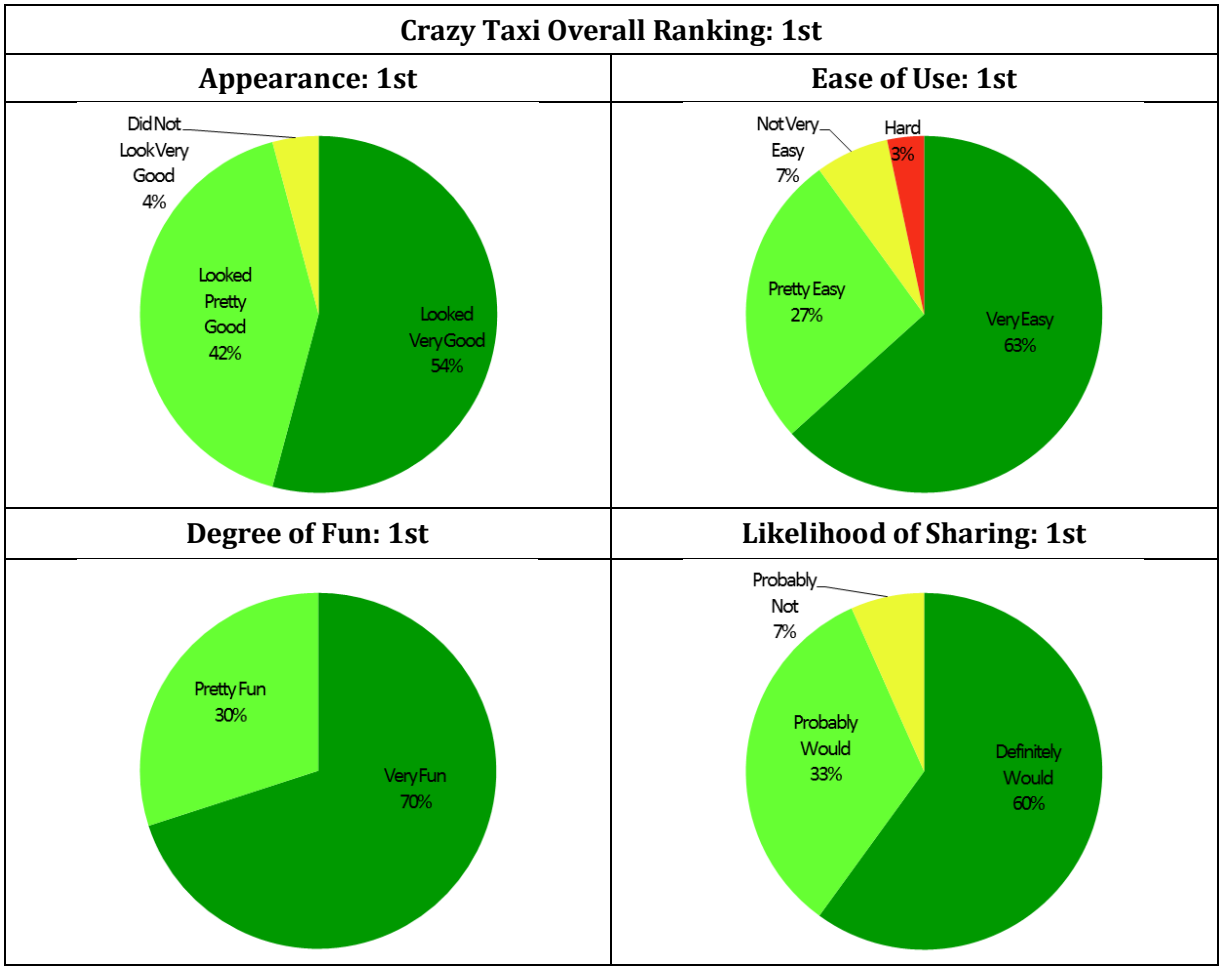
5.3 Individual Website Profiles

5.3.1 Crazy Taxi

Crazy Taxi was the overall favorite and the highest rated across all four categories. One hundred percent of students called the game very fun or pretty fun and 93 percent of students said that they would definitely or probably share the game with friends. See Figure 5.6 for a summary of student ratings in each of the four categories.

Students' initial reactions to the site were very positive. Before playing, five out of 18 students chose it as the game they were most excited to visit based on a screenshot alone. One girl's response to the site was "this is cool!" A boy described the site as "eye-popping" and thought the bright colors looked good. Several students have been to the Cool Math Games site before and a few had previously played Crazy Taxi. One girl recognized the website but said she had never tried it because it looked "cheesy."

Figure 5.6 Crazy Taxi Ratings



The majority of students quickly figured out how to play the game. Only 10 percent of students found the game to either be "not very easy" or "very hard". Still, there were a few challenging aspects of the game. Many students did read the instructions that appeared on the screen upon visiting the site; however, it was also easy to start the game without reading instructions. Jumping, which required use of the space bar, was the most difficult aspect of the game. Even after reading the instructions, some students could not figure out how to make the car jump; they did not realize that they needed to use the space bar. The game cannot progress if the car cannot jump over the obstacles. There were directions that explained how to do this more clearly, but they were further

down the page. The facilitators often had to direct the students' attention to those additional directions and show them how to scroll down the page. We only observed one boy who noticed a help button at the top of the page, which was denoted with a question mark. However, after reading the directions, he still had trouble because he did not know what the space bar was. Most pairs of students worked together to figure out how to play; they were engaged even before they were successful. Once students learned that they needed to use the space bar, some still had trouble getting the car to jump as it took a few tries.

The educational goal of the game is to identify multiples of different numbers; this was unclear to many students. Even when students were able to move the car, many failed to grasp the idea that there was supposed to be math involved in the game. Students mostly focused on driving and were not aware of the initial objective to look for cars that were multiples of two. The level of difficulty with regard to the math content varied across students; some found the math to be difficult, while for others, it was too easy.

To improve this game, one student recommended making it easier to jump, having the instructions appear at the beginning, and giving the player an indication of when he or she was doing the right thing. One girl suggested having more obstacles to jump over, like broken areas of the road. She wanted to be able to chase cars, like in police chase games. She also suggested changes to the aesthetics and wanted to add buses and stars (similar to Temple Run), and add diamonds to the cars. Other students wanted to jump for points and do more driving. One boy wanted a ramp for the vehicle to jump off of.

Despite some initial difficulty, students remained moderately to very engaged and were motivated to figure out how to play the game. There was a high level of interaction between the students. In most pairs, both students wanted to try the game and wanted to continue playing when their time was up. They liked the action aspect, including racing and crashing. One girl said, "That was awesome!" One student thought it was a cool game because it was teaching him something. Boys said they picked Crazy Taxi as their favorite game because they get to crash into cars, go fast, and jump. They also like that the game was timed, which made them have to play carefully. Among girls, Crazy Taxi ranked second overall. Girls thought the Music Mixer looked better than Crazy Taxi, which tied with Pyramid Panic for 2nd place in the appearance category among the girls. Girls also rated the Music Mixer as easiest to use, with Crazy Taxi following in 2nd place.

Crazy Taxi Key Takeaways:

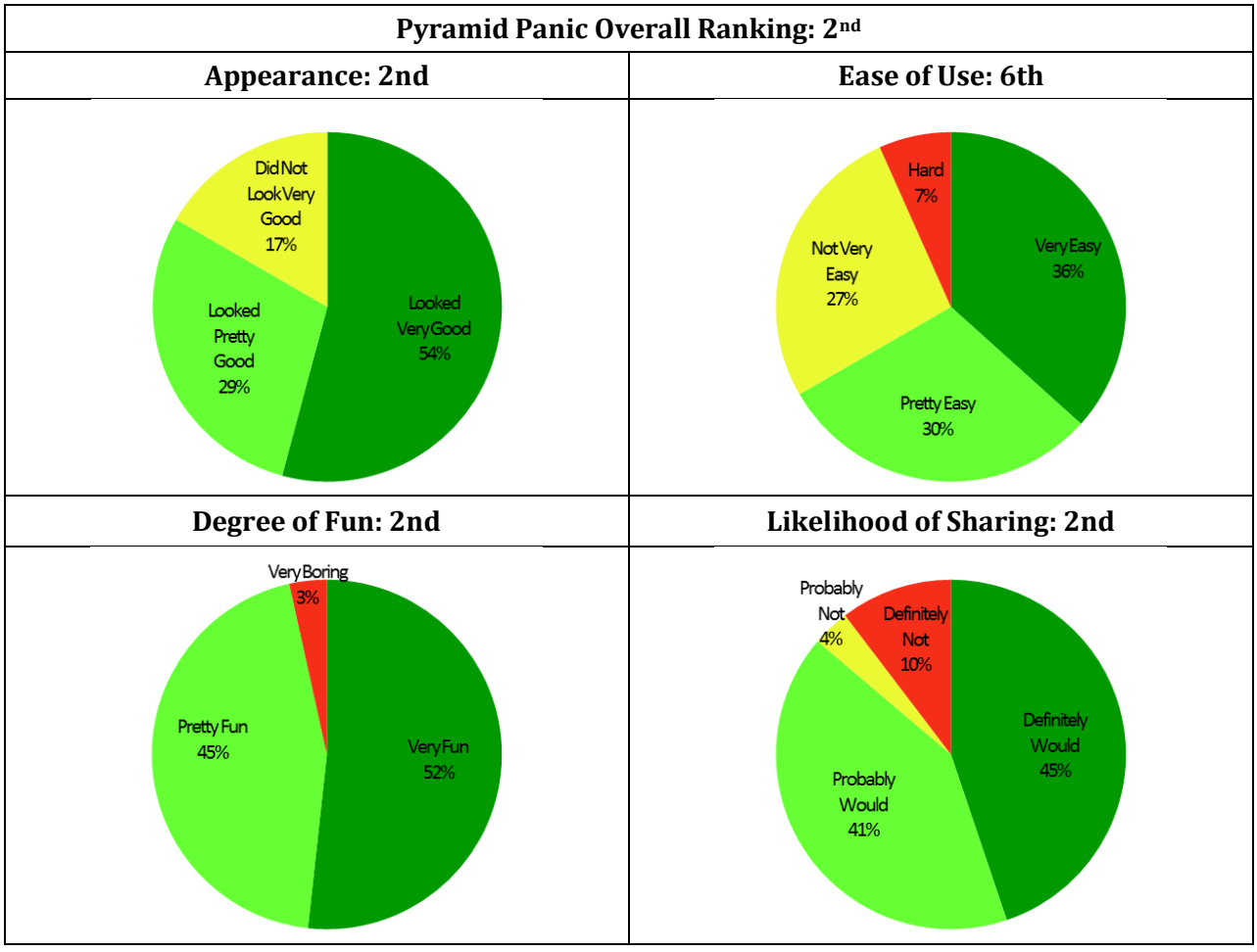
- Instructions should be up front and easy to find, and easy to access during the game.
- The "educational purpose" of the game should be made clear at the beginning of the game and reinforced throughout the game.
- There are varying degrees of comfort with using a keyboard. One student did not know where to find the space bar; this may be an increasing problem as more students use mobile devices.
- Students may need additional help or reinforcement after reading instructions for the first time.

- Students like the timing aspect of the game, and find it motivating and fun, if the level of challenge is appropriate.
- If the game is interesting, catches their attention, and seems fun, then they will persist through challenges.
- All students like action, but it may not engage all girls as much as boys.
- Students do like learning math through a game.

5.3.2 PYRAMID PANIC

Pyramid Panic ranked second in the overall ratings and in three categories: appearance; degree of fun; and likelihood of sharing. Only one student found the game to be "very boring," whereas 52 percent of students rated the game as "very fun." Eighty-six percent of students said that they would definitely or probably share the game with friends.

Figure 5.7 Pyramid Panic Ratings



Five out of 18 students picked the game as the best looking among all of the games before visiting the websites. One girl's initial impression of the game was: "This looks cool-ish." Another student's initial reaction was that it "did not look good." This could be due to the length of directions. That same student made sure to choose the "Easy" level because the game looked hard.

Though Pyramid Panic received high ratings in appearance, degree of fun, and likelihood of sharing, it was one of the most difficult games. Students did read the directions and one girl even read them out loud. The directions were very long and that can discourage students from reading the entire passage. Some of the students who were not in control of the keyboard became disengaged at this point. In the later focus groups, some of the facilitators encouraged students to read the instructions. However, even when students read the instructions, they were still a bit unclear about what to do and had lingering questions. Some students did not realize that they needed to collect gems to earn points. Only one student figured out that the mummy could shoot the monster when it got too close.

Perhaps the most difficult part was figuring out how to make the mummy move in the right direction. This required an understanding of the objective of the game as well as the math content, which was difficult for some students and may have impacted their motivation. The math also became more challenging in successive levels. Though they may not have caught all the nuances of the game at first, students learned by trial-and-error and by watching other groups.

Despite the challenges, students liked many aspects of the game and were mostly engaged throughout. Only a few students seemed to "give up." Students used words like "awesome" and "fun" to describe the game. One boy thought the game was really cool and liked the magically appearing stairs because it was similar to another game, Temple Run. Students thought the game was a fun way to learn math. One student even said that learning math was his favorite part. In addition, the chasing aspect of the game provided some fun and a good incentive to quickly figure out the math. However, one student suggested that the game could be improved by making a shorter "dizzy time" after a student answers a question incorrectly; the game stalls until the mummy is no longer dizzy, and she did not like the idle time.

In general, there was a high level of interaction between students. The student who was not in control of the keyboard tried to help the student who was actually playing the game. One pair of girls was very involved in playing this game and said things to one another like, "Look at the demon!" and "Hurry up! Go down!" Occasionally, there was less excitement and less involvement from the student who was not in control of the keyboard and mouse. A few of those students were not interested in trying the game.

Boys seemed to like the "creepy" aspects of the game. Reasons that some of the boys picked Pyramid Panic as their favorite game include:

- It was fun running away from the monster.
- The leveling was good.
- It was fun when the mummy got stuck and "dizzy" and then was eaten by the monster.

Some gender differences were evident in students' reactions to the game. Girls were less likely to say they would share Pyramid Panic with friends than were boys. The girls were more likely to share Crazy Taxi and Music Mixer than Pyramid Panic. A few girls did not like the "creepy factor." Others thought the monster chasing the mummy was cool. One student said she was kind of scared of the mummy, and another was "freaking out" when the monster was chasing the mummy, but still

seemed to have fun. When asked how to improve this game, one girl would have preferred to change the character from a mummy to something else.

Pyramid Panic Key Takeaways:

- An appropriate level of challenge is important. Students like to be challenged, but may give up if the content is too difficult. On the other hand, some degree of challenge can keep students engaged.
- If the game is fun and engaging, students will persist through challenges and figure out how to play through trial-and-error.
- Boys especially liked the "creepy factor" of the game and liked to be eaten by the monster, even though it made them go back to the beginning.
- Many students were motivated by the fast pace of the game. They had to move quickly or the monster would catch them, but did not like when the mummy stalled. However, the time constraint exacerbated the challenge for students already struggling with math content and further frustrated them.
- Students need clear instructions that are concise. It may be more effective to deliver instructions in a series of small paragraphs.

5.3.3 MUSIC MIXER

The Music Mixer was evaluated by all students, except for the pilot group. Student reactions were varied across the different focus groups for both girls and boys. Overall, the Music Mixer received the third-highest rating. It also ranked third in terms of average score on appearance, degree of fun, and likelihood of sharing. It was ranked fourth in ease of use. (See Figure 5.8.) Though no student rated the site as "very hard," a quarter of the students rated it as "not very easy" and just under half found the site to be "very easy." Eighty-seven percent of students rated the site as either "pretty fun" or "very fun," and 79 percent of students would probably or definitely share the website with friends.

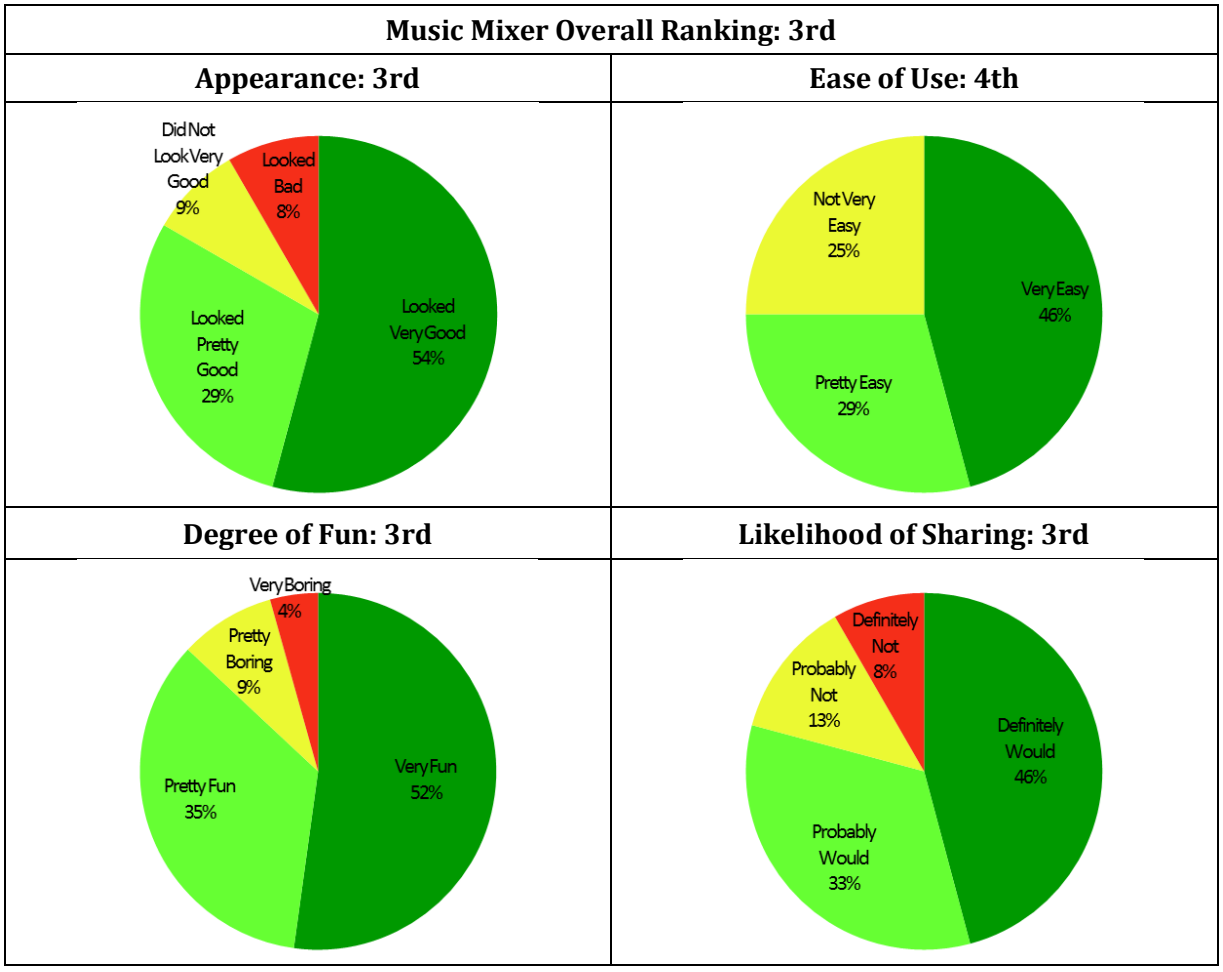
Five out of 18 students picked the game as the best looking based only on screenshots and before visiting the website. This is on par with both Crazy Taxi and Pyramid Panic. Only 17 percent of students later thought the site "did not look very good" or "looked bad." This site can serve as an example for the type of design that would draw students' attention to a music mixing application.

An immediate challenge was the lack of instructions. The site only showed instructions for the first group of students; they did not come up again when the page was refreshed for subsequent groups. Even when the directions were displayed, students were confused at first. One girl said, "Weird. I don't get this." Students started to explore the site by clicking around the screen. One student said that he "didn't need instructions," when he first saw the site, but later had trouble figuring out how to use the controls.

In the final focus groups, the facilitators provided varying degrees of instruction, which helped the students become engaged with the application more quickly. One boy thought this was a fun and easy website if you are shown how to use it. The second group of boys, who received help from the facilitators, rated the Music Mixer much higher than the first group of boys, who gave the site an

average overall rating of 3.5. This discrepancy may also be due to underlying characteristics of the two groups; in general, the second group was much more excited. A boy in the first group said that overall, the game was hard. Another in that group said he preferred playing games over making music. Several in that group said the website looked like it was for girls. However, no boy in the second group made that comment and five out of the six boys in that group gave the site a perfect ten.

Figure 5.8 Music Mixer Ratings



Interestingly, the level of instruction did not seem to affect the girls' ratings; the Music Mixer was the highest rated overall in both groups of girls. After the girls received help navigating the site, most enjoyed playing with the characters and the music. However, there were a few girls who found the site to be boring. Despite the challenges, the girls still ranked the Music Mixer as the easiest site. This suggests that they will persist with a site that is initially difficult to navigate if they are excited to learn how to use it. They were also more likely to tell their friends about the site than were the boys. When asked how this website might be improved, one of the girls said that it would be fun to be able to post the music you create and have other kids vote on it. If you received enough

votes from the community, the player could get points for new characters, new beats, and new instruments.

Though their understanding of how to work the site was murky, students began to customize features right away. When one pair of boys saw the word "customize" in the instructions, they became immediately excited. The customization aspect kept them engaged. One boy liked that because "You can change everything and make it how you want." Unfortunately, there was not enough time during the focus group for students to explore all of the features. Some students spent most of their time modifying the traits of the characters in the band. Others played with the music mixing board. One boy said that overall this site was "pretty good" and that he really liked that the characters did what he wanted, that they can be changed, and that you can record the music you make. Still, there were students who were less enthusiastic. When asked if they liked the site, one girl said she "kind of" liked it. It was also clear that many students enjoyed playing with music, as they were bobbing their heads and dancing in their seats.

Music Mixer Key Takeaways

- Students are very excited about customization.
- It is important to make sure that a site appeals to both girls and boys. Girls may like music mixing better, but it also appeals to many boys.
- A difficult application needs features to keep students engaged. If the site looks fun, they will persist through challenges.
- Having a variety of features can keep students engaged, though it's important that they understand all the features up front, or they might lose interest.
- For a site with many features, it may not be enough to have one set of directions up front. It would be helpful to have "help" boxes near each of the different features.
- The Music Mixer is an example of an attractive music mixing site.
- Some students may prefer game websites, so it may be a good idea to incorporate a "game" aspect into the site.
- Girls like having a "community aspect" to the site. They want to share their music with friends and be rewarded for their work.

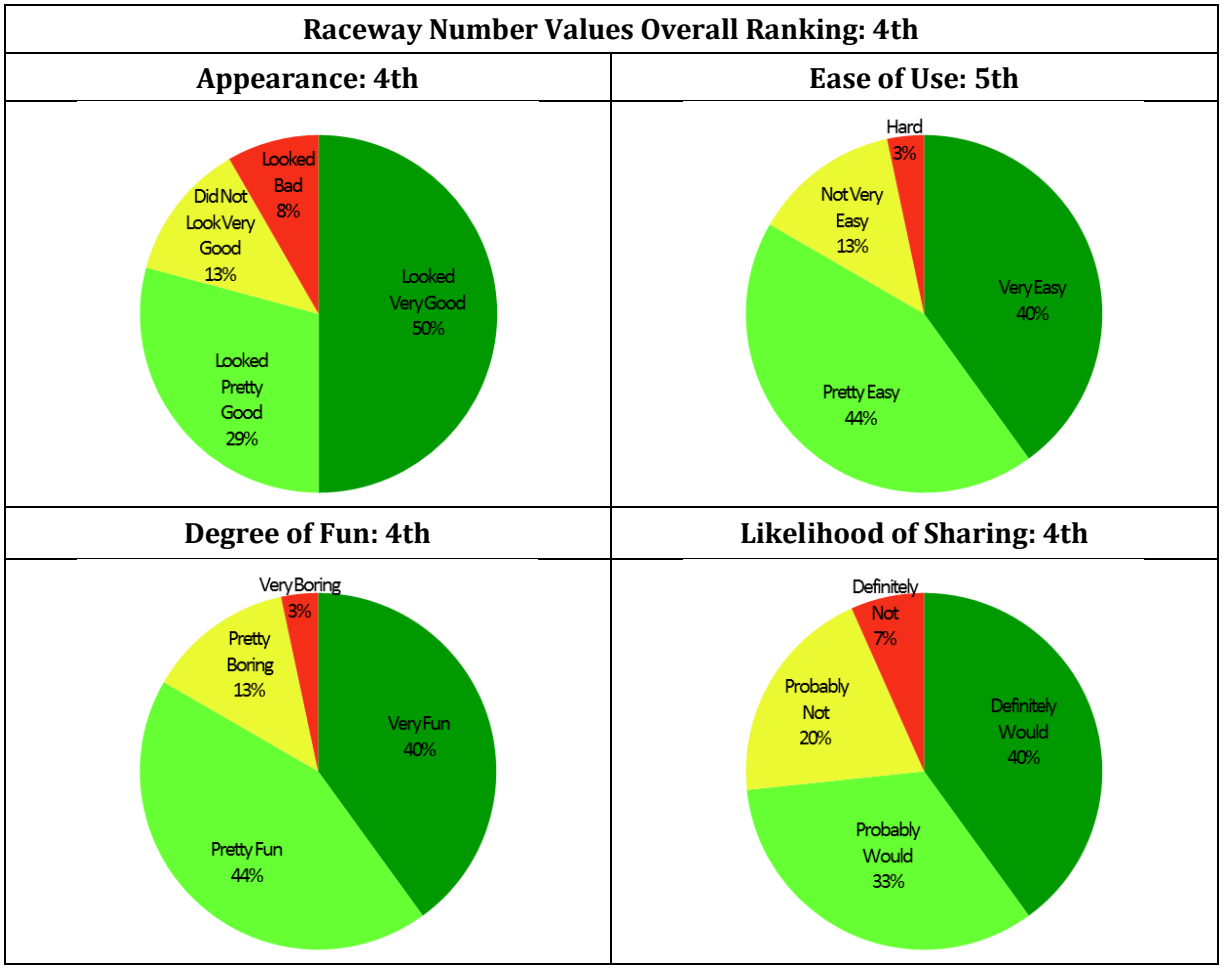
5.3.4 Raceway Number Values

Raceway Number Values ranked fourth overall and in three categories: appearance, degree of fun, and likelihood of sharing. It ranked lower (5th) on ease of use. (See Figure 5.9 for a summary of student ratings in each of the four categories.) There were no meaningful gender differences; the average rating given by boys and girls (6.2 and 6.6, respectively) was almost the same. There was more variation across groups than by gender. Several students were familiar with the game. One girl mentioned this was her favorite game to play in school. Though it was one of the lower-ranked games, we observed the students interacting and having fun. We also observed that many students wanted to get a turn to try it.

The game was intuitive for most students. They were able to figure out how to play rather quickly and without paying much attention to the directions. The lower rating regarding ease of use may be due to variation in student familiarity with the math content. The first level which consisted of

comparing single-digit numbers was too easy for some students, but actually difficult for others. The degree of challenge increased in subsequent levels. Most students chose to start on level one; those who started at higher levels experienced difficulty. One girl's initial impression was, "Looks like it involves hardness."

Figure 5.9 Raceway Number Values Ratings



Students liked many aspects of the game. One boy liked that it had a lot of bright colors and that it's "eye-popping." Girls liked that the game continued to give the player more tries if they weren't initially successful at answering the question and that the reward for getting the math questions right was to play a racing game. A few students thought that it was a fun way to get them to do math problems. Students were more engaged during the racing game than during the series of math questions. Students were laughing when they were dodging cars and some girls were dancing in their seats to the music, which they thought sounded like Mario. One girl exclaimed, "Put on your seatbelt!" They liked that they could crash into cars and slip on the oil, and that it had a little bit of math. One boy liked that you could give the car a boost if you pressed the "up" button, though most students did not discover that capability.

Though the racing aspect of the game was fun, it was not very motivating and did not seem to reinforce the math content. One girl thought the game was "pretty good," but actually liked the math part better than the racing part. When asked how they felt about educational games that reward you with a racing game, one student said the game was pretty cool because it teaches you to drive more than math. When asked if they would play the game at home, one girl said she would play it if her dad said she had to play math games. Even though it seemed like she was having fun, she then said the game was boring.

When asked how this site could be improved, some students wanted more math content and more math questions to answer. One student said that there should be a man running instead of cars and that the man should grab numbers that are smaller than 50, for example. Another said that there should be both more math practice and a longer driving time. Students wanted the racing game to be slowed down and have more activities incorporated. They wanted more action and adventure. For example, one student wanted the game to throw objects at the car while they were driving. They would have liked to view the car and the road from different angles. A few students wanted to be able to customize aspects of the game, including designing the car and adding passengers. Lastly, one student commented that the game would be better if you could use the mouse to move the car instead of the keyboard. As observed in previous trials, students have varying degrees of competency and comfort with computer hardware.

Raceway Number Values Key Takeaways:

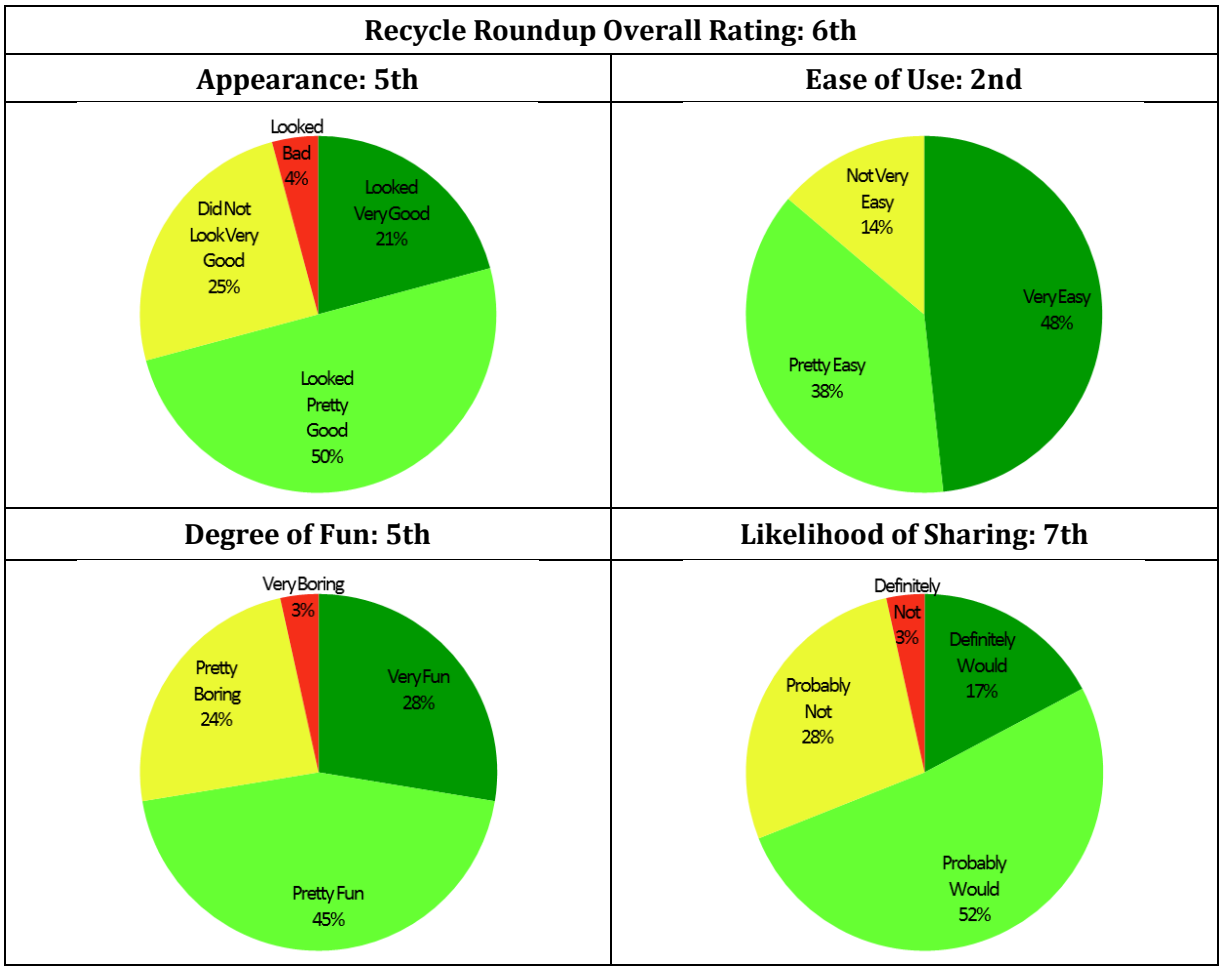
- The level of challenge needs to be appropriate. If it is too easy, students will gloss over the educational content and lose interest. If it is too difficult, students may be less likely to stick with the game.
- The "game" aspect can be fun, but if it doesn't reinforce the desired skills, the educational value is limited.
- An educational game needs to keep students motivated with desirable payoffs.
- Students like action, adventure, and variety.
- Students value opportunities to customize games.
- Students have varying degrees of competency and comfort with computer hardware and may be uncomfortable with the keyboard.

5.3.5 Recycle Roundup

Two out of 18 students chose this site as the best looking before they played, by looking only at a screenshot. Though 71 percent of students later thought the site looked very good or pretty good, it ranked last out of five websites in appearance. (See Figure 5.10 for a summary of student ratings in each of the four categories.) There were some images that students found funny. They liked the gorilla and the dirty diaper. However, many of the graphics were unclear, making it difficult for the students to identify the items they needed to sort. One student noted that it was too much to look at all at once and would have preferred to have the items fall from the sky one at a time, instead of overwhelming the screen with garbage. Many students agreed that there were too many items falling at once.

The purpose of the game was intuitive and the students caught on quickly. Though it was rated as one of the easiest sites, students did have some difficulty. In addition to having unclear graphics, the site provided poor feedback on whether or not the students sorted the items correctly. Some students realized that the gorilla smiled when they placed an item in the correct bin and that they earned a point for each correct item. However, the scoreboard at the top of the screen was not very clear and it was difficult to notice the score changing amidst the constant flow of items falling from the top to the bottom of the screen. The gorilla's gestures were too subtle for many kids. One boy suggested replacing the gorilla with a dog that would bark and wag its tail when you put the item in the correct bin and growl when you put the item in the incorrect bin. With improved feedback, the site has the potential to help the students learn about recycling. Students also had trouble manipulating the objects and placing them into the bin. It was easy to move the gorilla around, but hard to grab the items. One girl, who was not playing, said it did not look fun because it looked hard to catch the items. Still, the students did get better the longer they played.

Figure 5.10 Recycle Roundup Ratings



Even when they were able to move the objects, many students lacked the prior knowledge to correctly sort them into the three bins: recycle, landfill, and compost. Many students did not know what each bin was for, especially the compost bin. This site may have been more effective if it

provided a description of the types of items that belong in each bin before the game began and gave better feedback on whether or not students were mastering the content. Still, two boys reported learning something about recycling. In addition to having the items fall one at a time, some students would have preferred for the game not to be timed because it was too much pressure. (These were likely the students who had little prior knowledge about recycling.) But others enjoyed the challenge and liked being under a time constraint.

Students ranked the site fifth out of five sites in terms of fun and only 28 percent of students said the site was "very fun." Though some of the animations were funny and the majority of students found it to be easy, the game was not exciting. The facilitators noted that the individual student playing the game was engaged, but that there was less interaction between the pairs of students than with the other websites. When students were not in control of the keyboard, they were disengaged and often looked around at the other groups. One boy observing his partner play the game said he was not interested because it looked like a "normal game" with "nothing new or exciting." To make the site more fun, one boy suggested that the game should have more funny things, like funny words coming out of the character. Though the payoff was not that motivating for some of the students, others liked the environmental theme and the idea of getting all the trash off the ground. When asked about recycling games in general, one girl replied that she liked them because "recycling helps the world."

Recycle Roundup Key Takeaways:

- Students prefer sites that are not too cluttered and have clear images.
- "Funny" items can increase student interest in a game.
- Student perceptions of the level of challenge are influenced by their prior knowledge; this site could have addressed this by quickly teaching the students about the basics of recycling at the start of the game.
- Students need clear feedback in order to stay engaged and learn the content being taught by a game.
- Student motivation and engagement is negatively impacted if they have difficulty maneuvering objects and characters.
- Some students are inherently motivated by environmental themes, though the level of interest may vary across students.

5.3.6 MATH MAN

Math Man was only played by the pilot group. Though it was fairly easy to use, it ranked low in terms of fun and students were unlikely to share the game with friends.

Table 5.12 Math Man Ratings

Overall Ranking	5th
Ease of Use	3rd
Degree of Fun	5th
Likelihood of Sharing	6th

Without obvious instructions to read, students struggled to understand the purpose of the game. They steered the character through the maze, but didn't make the connection that they were supposed to collect question coins and eat the ghosts with points, until they received additional guidance from the facilitator. Many students were frustrated. Fourth-grade girls struggled with the level of math in this game. As a result, the girls were less engaged with this game than they were with other games. When asked how this game could be improved, the girls said that they would like more questions.

One boy who was playing liked it a lot, even though he had difficulty figuring out how to play. He thought it would be easier to move Math Man around with a joystick, instead of the arrow keys. One boy had played this game before and said he likes the Cool Math Games site. He mentioned that he likes another game on the site where you launch Santa into a chimney. Cool Math Games likely keeps students engaged by offering a large variety of learning games (over 300 games). Having several activities in one website encourages students to visit multiple times.

Math Man Key Takeaways:

- When students start playing without understanding the objective of a game, they may give up, unless the activity is engaging enough to motivate them to persist.
- Students may have difficulty maneuvering a character through a maze with a keyboard if they are not accustomed to using a keyboard.
- If the educational content of a game is above students' grade level, they may feel discouraged and stop playing.

5.3.7 NUMBER JEOPARDY

Number Jeopardy was only played by the pilot group. It was the lowest rated site overall and received the lowest average ratings in ease of use and degree of fun. Interestingly, it was ranked 5th for likelihood of sharing. Many students were unfamiliar with the Jeopardy concept and were uncertain of what to do to play the game. The 4th grade girls struggled with the level of math in this game, and some of the 5th grade boys did as well.

Table 5.13 Number Jeopardy Ratings

Overall Ranking	7th
Ease of Use	7th
Degree of Fun	7th
Likelihood of Sharing	5th

The boys had trouble finding the instructions, and many students also had trouble with typing. They had to first type their name and then type the answers to the questions. One boy was not sure of what he should enter into the text box when comparing numbers. He also didn't realize he could delete the number he entered after noticing that it was incorrect. It would have been easier for the students if the questions provided multiple choice answers from which they could choose.

In general, engagement and interaction were low. The design of the site was dull and the students all agreed it was boring. It had no adventure and needed more "fun" aspects to make it a better game.

Number Jeopardy Key Takeaways:

- Students were not familiar with the game show, Jeopardy. As a result, they did not find the game to be intuitive.
- Students may struggle if a game requires them to type their answers, rather than choosing from multiple options.
- A site needs to be visually appealing or students may not be interested in trying it.

5.4 Feedback on Environmental Defenders Character

Students were asked to compare two sketches for an Environmental Defender character. Overall, the majority of students preferred the character with the white background (58 percent to 42 percent). However, there were significant gender differences. Seventy-five percent of girls preferred the character with the white background, whereas 58 percent of boys preferred the character with the green background.

All students agreed that the character with the green background looked more like a cartoon, and the character with the white background looked more realistic. Girls expressed a preference for realistic-looking characters, whereas boys liked cartoon features. The character with the white background looked older. One group of boys estimated the age of that character to be between 14 and 17 years-old. They thought that the character with the green background looked from 9 to 13 years-old.

Boys liked the character with the green background for several reasons:

- It looked like a cartoon or character in a comic book.
- It was less realistic and more fun.
- It reminded them of Ben 10 and Danny Phantom.
- They liked the character's shoes.
- It looked like a 3D animation.

A few girls preferred the character with the green background for the following reasons:

- Some girls prefer cartoons.
- It looked less creepy and weird than the other one.
- It looked like a character you could design clothes for, or print out and color.

Boys who preferred the character with the white background liked it because:

- The character looked older and more grown-up.
- The character had better clothes.
- The character looked real, not animated.

Girls gave several reasons for preferring the character with the white background:

- It was more realistic and less cartoonish.
- They could see the details better.
- It had more color and was less dark than the other one.
- The character with the green background looked like a rat.

Two girls in one group were vocal about not liking either character. They seemed to have fun disparaging both characters and may have influenced the impressions of the rest of the group. Their remarks included the following:

- "Eew."
- "Look how big its head is!"
- "I just think they're freaky."
- "Looks like they're just staring at you forever."
- "If you put them on a website, email us and let us know." (So they can avoid that website.)